

## SEQUENCE LISTING

&lt;110&gt; BRAIN AG

&lt;120&gt; Isolation and Cloning of DNA from Uncultivated Organisms

&lt;130&gt; G1184 PCT

&lt;150&gt; 02 01 8210.1

&lt;151&gt; 2002-08-20

&lt;160&gt; 35

&lt;170&gt; PatentIn version 3.1

&lt;210&gt; 1

&lt;211&gt; 33925

&lt;212&gt; DNA

&lt;213&gt; Crenarchaeote

&lt;400&gt; 1

cacagccttg ttgatcataa cattaaaact taattcttcc agagaaattc tttttttctc 60

caagttttct gcaattgatt gcaacttttt ttttatcttt tcctttgctc tttcaaagtc 120

tttttctgaa aatatttctt taaggacatt taatatgtca tagaaagctt gtcttattat 180

tggaggtgta tgagacttct tccctgttaa tcctttaaca tctacagttc cgtcctccaa 240

tacacctagg taattttttt ttagttcact aaaaaccacg tagcgatata ttttatctat 300

ctccaaatct atgcctagtt cttttttaga ccaggatgaa attccactta atccttcctt 360

ggaaggattc tttaggaaca gagaatccgt atcacogtaa ataacctcaa tcttttcttc 420

gttgcatttt tcaatagttt ttgttggtgt catccttcca accgctgcgg tagcctcagc 480

tacaggtaaa caatagagcg gaaatatttc agcaccata accccatacg tagcatttaa 540

aataaccttt atggcctgac tgataacact gtatagctgt ttatcctctt tatccaaaga 600

attatccttt gatagatatt tgtaataatt aacccttaga tcccttaggg ttcctatcaa 660

tatggaggtc atcccttgct tttccttgca aaccaatgg tttgtttgct caatatgtgt 720

tgatggatcc cttctgcaat tttcatgagg acaattgact gtttcgtaag ataaattgtg 780

aactttaatt atgctaggat acagactagc aaaatctaca actatgacat tgaaatgaat 840

tcctaaaacg ggetcaacca ccagacctcc tcgatatttt ttttccttta taatggcaac 900

tgtagacgat gttccttttt tctgtaattc atctttacgg ggaataatga tattttgctg 960

cctatgttca aaaaacatca tggacctaat ccattgattc accccgaatc ttgttatatc 1020

ttctattgac attcgggata tcctagaaat gataatcaac aattttatca gtaaattgtc 1080  
attgaaagat gtcagacgaa atgtcaagtc tgcattctttg aggcaataact cggccagttt 1140  
ttccaatgga agatcaccta tgctttcatc aaagtctatt tttgactcgt ttaatagggc 1200  
ttcgcagata gcattttaag taaactcaga gtattttatga ctaaaagcat aattctgtac 1260  
agattttattt tgaaatgtcc tgaataaatc gatatggatt ccatgcttta aggaaaccgg 1320  
atccgcctga ataccctttt ttataaaaaga gtotTTTTTTT actaaaatag gcaccaattc 1380  
tttactaatg ggttttttgt gtacagggtc tatcgatggg tcttgagatc tagcatataa 1440  
ataaggtaaa tcaaaatcat caccattaaa ggTTAAAact attggataat tttgaataat 1500  
agcaaaaact tttagtatca tgtctttttc gctatcacat aattcaacgg ttgttgaatc 1560  
tagtttagag ggatcaaaat ttggatcttt tcttaagacg aatacctttc taaatccatc 1620  
cgatgccgat aaaccactg cagtaattac tttatcgtga tctctggctg tgggcatcct 1680  
tccctcttca gagtccactt ctatatccaa agaaattctt ttgatatccg gaataggctg 1740  
gtttaacaat cttgaccact ttattagaaa ctcatatat tcaactactt ttggctcatt 1800  
ttctttaaaa ttaggtttta tgagattatc cagatattcg tcaactttct ctggcattgg 1860  
gaattcatga aaaactaaat tattgcctat tctgttataa aacgctcccg gaattagacc 1920  
caaatcgaat aaataacttt catgggtattt gatatcagcc tccaagaag taaccttttc 1980  
cctaaaaacta ctatctgttc caccaatgga aaggggggtca ggggcaatta ttttaaaaac 2040  
cgatatttcc ttgtcctcaa tatcgtccat tttttttatt ttttctagtc taaacctatg 2100  
tggtctcttg ctaactattg ttttaacctg atcagaatag agttccttta caaagcaata 2160  
aggttgatgt ttatttatat gattttcaat aaaagactcg ctccaaaaat atatttgaga 2220  
atcttctgga ttgtaaaact tcaaaaacac tgattttttt tctcctatgt aaacggaaga 2280  
aagtaacaat gatggaatat tttctggaag ttctttttga taataactat ttttctctc 2340  
cagaggcaag tcggatttta tcaccatatt tttatttcat tcatcctttt aaaaattaat 2400  
gacttgTTTT agaaaactat caaatttgat ttacctagca ccatcaaggc tgatgtctga 2460  
ctaggttatt tttagcatta ctgatttatt tttctttgag gacaaacctt cttaagaata 2520  
taccattat attattcaag cgtgtcaatc gttaactcag tattatcaat atcgacagca 2580  
atgtgagaac aagagggttt ggatgtggat ggatgatcaa tggttgattt tcaaattcct 2640  
gtatgaaata ttgtgagcaa tcgatatatc attagataaa agaagattta gttaggacat 2700  
cttgataata tattcgtgta gattgatttg aaaaaacagc agcaataaga aaatttaata 2760  
cgataaaata cgataacttc gactaaactaa catcccttgg gaaaagaact taatgccoga 2820

tccccttttt	tttgtttttt	aaagaaaaaa	gaagatttat	attaacaatc	ctaccataag	2880
tagtagaacg	cgtccaagac	aaaaggcggc	gtcggtagtg	aagttggttt	gtgccataaa	2940
gtgatttact	gacctccaga	tgcgctcggt	acattactgg	ttaacgatat	aatattaaaa	3000
tagtgggata	atggggattc	gatcaacaca	tcggaactga	cttgatggat	cggatctgac	3060
atgggaagat	cagacagaca	ttgaaaaaga	ttcattataa	cagcacaaaa	gatatcattg	3120
caggcattgt	ttgtatgtgt	gtgacaatac	aatacagcat	atgcttgtga	gttaatctaa	3180
caaataacca	aataaacaaa	tcagaagggt	attagagttt	ttctttcttt	ttcgaatcgt	3240
ctctctttcc	ctgcttttta	aaggcagggg	gaaaactcaa	taaacgttct	tttgtgtttg	3300
ccaatggctt	ttccctcttt	ctcttaccgt	cttctcggat	gtgagggcgg	aggcgggaag	3360
gttggtggca	gagaccaaag	caacgcgtat	atacaccata	aagcaaaagt	caaccgatag	3420
gtaacaaatg	gcgcacgttt	gtgttttttt	cottgtggcg	ttttgcctct	ctcaaaaaag	3480
gcaaggcaaa	accatattgt	gtgcgtttgt	catctgttat	gtttttcacc	atcatcattt	3540
ttttttgaat	ccggttgatc	ctgccggacc	cgactgctat	cagagtggga	ctaagccatg	3600
cgagtcaaca	tagcaatatg	tggcatacgg	ctcagtaaca	cgtagtcaac	atgcccaggg	3660
gacgtggata	acctcgggaa	actgaggata	aaccgcgata	agtcactact	tctggaatgg	3720
gtaatgactt	aaatctatat	ggcccctgga	ttggactgcg	gccgatcagg	ctgttggtga	3780
ggtaatggcc	caccaaacct	gtaaccggta	cgggctctga	gaggaggagc	ccggagatgg	3840
gcactgagac	aagggcccag	gccctatggg	gcgcagcagg	cgcgaaacct	ctgcaatagg	3900
cgaaagcctg	acagggttac	tctgagtgat	ttccgttaag	gagatctttt	ggcacctcta	3960
aaaatggtgc	agaataaggg	gtgggcaagt	ctggtgtcag	ccgccgcggg	aataccagca	4020
ccccgagtgg	tcgggacgtt	tattgggcct	aaagcatccg	tagccgggtc	tacaagtctt	4080
ccgttaaadc	cacctgctta	acagatgggc	tgcggaagat	actatggagc	taggaggcgg	4140
gagaggcaag	cggtactcga	tgggtagggg	taaaatccgt	tgatccattg	aagaccacca	4200
gtggcgaagg	cggcttgcca	gaacgcgctc	gacggtgagg	gatgaaagct	gggggagcaa	4260
accggattag	ataccggggt	agtcccagct	gtaaacgatg	cagactcggg	gatgaattgg	4320
cttcatgcca	attcagtgcc	gcagggaagc	cgtaagttt	gccgcctggg	gagtacggtc	4380
gcaagactga	aacttaaagg	aattggcggg	ggagcaccac	aaggggtgaa	gcctgcgggt	4440
caattggagt	caacgccgga	aatcttaccg	ggggcgacag	cagaatgaag	gtcaagccga	4500
agactttacc	agacaagctg	agaggagggt	catggccgtc	gccagctcgt	gccgtgaggt	4560

gtcctgttaa	gtcaggtaac	gagcgagacc	cctgcctcta	gttgctacca	ttattctcag	4620
gagtagtgga	gctaattaga	gggactgccg	tcgctgagac	ggaggaagga	gggggctacg	4680
gcaggtcagt	atgccccgaa	accctcgggc	cacacgcggg	ctgcaatggg	aaggacaatg	4740
agtatcgatt	ccgaaaggag	gaggcaatct	ctaaacctta	ccacagttat	gattgagggc	4800
tgaaactcgc	cctcatgaat	atggaatccc	tagtaaccgc	gtgtcactat	cgcgcggtga	4860
atacgtccct	gctccttgca	cacaccgcc	gtcgcttcat	cgaagttggg	tcttggcgag	4920
gtgatgccta	attggtacta	tcgaacctgg	ggtcagcaac	gagggagaag	tcgtaacaag	4980
gtggccgtag	gggaacctgc	ggccggatca	cctccttagt	tatcatatct	tgcaacacag	5040
aacaaaatag	acaaaaagag	aaaaatgggt	gggaatgaag	gaaaaactct	accacaccgt	5100
taatttggtt	ccttgggatc	ttggtcagct	tggtttacaa	acatgaatgc	tgcaagagtat	5160
acatcacaca	tgcaaaaaca	aagcctgcag	tggtatctgt	gcaagtgtta	taatggacat	5220
ggatagggat	atgggcatgg	atgtgggcaa	cacaacacaa	agtagtggtg	ctagaccaga	5280
tccgctctgc	tcagtgcag	tggaacaaat	ttgctagtga	cctgtctcta	tctgaatgaa	5340
tgtgtctgtc	tgtctggtct	tttgcgatg	cgtaccgcgc	ccgtgccaaa	gagtcgggtc	5400
gtggttaagc	caacacaata	accatcagag	taaaaaaaac	agagtaatgc	acgcacacac	5460
acatgtgcac	acagaaaaag	cagaaaggaa	aagagaaaga	aagaaaagga	aggaaagaaa	5520
gaaaaaaagt	gaatacggat	gcaattcttt	gtcactaaac	tgaggagttg	gagagacaaa	5580
ggatgaaggt	gacatagcag	gcaacaccta	gacaaatata	agaagggtgt	tgtttgcgat	5640
gatgtcgtgt	ataggatcaa	accattaaaa	gatataacaa	tacattagat	atattaaaaa	5700
tataatgatt	cacgtaaaaa	tgaaatagt	aaaaattata	aaaaaatgta	tatctggttg	5760
tagtgcagtg	taatacataa	aaagcgaatg	attttatcat	gaaaaccgaa	aattaattag	5820
ttattaccat	caatagaaaa	caaaattgga	aactggaact	ggtgcaaaga	cgccggttgg	5880
tggatgactc	ggcttgataa	gcgaagaagg	acgtggcaag	ctgcgataag	cctggggtag	5940
gtgcatgcga	ccgtcgatcc	cgggatgtcc	gaatgaggtc	tctctttaca	ctcccttgct	6000
ttgttgcttg	ggagagcgaa	ccgtccgaag	tgaagcatct	gagtaggacg	aggaggagaa	6060
atcaattgag	attccgtcag	tagcggcgag	cgaaagcgga	acagcccaaa	ctgaatctgc	6120
cgtggttaaca	cggcagagat	gtggtgttgc	ggttatagcg	cataggatcc	tgcccttgga	6180
gctgaagtgt	actggaatgt	accggaacag	agggtgatac	ccccgtaggc	aatggaggc	6240
gggattctgc	tatatccaga	gtagctggcc	ttggcagtg	ccagtgaagg	tggtgaaag	6300
tagtatccaa	ggctaaatat	tcatcaagac	cgatagaaaa	ctagtaccgt	gagggaaagt	6360

tgaaaagtac cccggaaggg gggttaaaag cgcctgaaac caaccgggta cagacgtgta 6420  
tggctcgaag ggataaaatc tagagtcata cgttccgtct agaaacacgg gccagggaga 6480  
ttgctgtcat ggcaagctta acctttttaca aagggaatgc gaagggaac cgaatttgcg 6540  
catttttctct ttattgagaa aagaggcaat ggatctgaaa gggctctcaag tcatggcagt 6600  
aaggctagaa accggacgat ctattcctgg ataagacgaa ggtgagtga aactcgtg 6660  
aggtctgcaa gggctctgac gtgcaaatcg gtcccctgat ctgggattag gggtaaaaa 6720  
ccaatctagt ccggtgatcg ctagttccca ccgaagtgga tcgcagtcct gccttagctg 6780  
agatggcctg tattgtagag caccgatcgg gcggtgaagg ctcgaaagag ctgccatcc 6840  
attcgaactc cgaatatacg ggcgtcgtag aagctaggag gcgggtttat gtggggtaag 6900  
cctcataacc gagaggggga caaccagac taaagttaag gtccccaat gtctactaag 6960  
tgtcaaacca aagggtgttt tcgagcagag acagcaggaa ggtaggctca gaagcagcca 7020  
ttctttaaag agtgcgtaac agctcacctg ccgagctcga aagccccgaa aatgtacggg 7080  
gctcaagtag actaccgata ctttagacca ccgacgatgt cgggtgcgtgg taggtggg 7140  
tagtggttgg gtagaagctg ggctgtaaag tccagtggac cgaactacta gtgcagatcc 7200  
tggtggtagt aacagcatag ccgggtgaga atctcggcga ccgcatgggc aagggtttcc 7260  
cggcaatgcg tcatcagccg ggagttagcc ggtcctaata acaacctcaa cagaattgtt 7320  
tgaatgggaa actgggtaat attccagtgc cttgaaagtt cgttaacacc ttttctgtcg 7380  
cttccggata gggtaagcag aaccgtcgtt ctgtccaagt attctagctt tgaggagtac 7440  
cgtaatggcg agaataaaag cgagatacga atggcccttc gcaaggaggg tttgcttgag 7500  
tccaggagac actgaaagca gaaacaggga gatactttca agaccgtacc gagatccgac 7560  
actggtgccc tggatgagaa gtctaaggtc tatcgggtat accgtatggc aagggaactc 7620  
ggcaaaatag ctccgtacct atggtataag gaggtcctgc agttttttacg aggagtaggg 7680  
attgcaggtc gcagtgacta gggggtcccg actgtttaat aaaaacacag gtggctgcta 7740  
gtccgaaagg atgtgtatgg cctctgtatc ctggccagtg gcggtaccta aaacctgggt 7800  
acaaccgggc taagggccgc taaacgcgg gagtaactct gactctctta aggtagccaa 7860  
atgccttgtc gggtaagttc cgacgtgcat gaatggaaca acgagggcc cgtgtccct 7920  
gcctacaacc cggatgaagc acataacgtg gacgaacagt ccacgaacct ctgtcgggga 7980  
gagaagaccc tgtggagctt tactgcagcc tgttggttgc atatggttgc aaatgcagag 8040  
agtagctggg agccgttatg gtcagttctc cgggactgat ctaggcgaca gtgtaacacc 8100  
agccatttgt taccgtatcg ctaacctgct tatgcaggga catcggcagg tgggcagttc 8160

ggctggggcg	gcaccccctt	gaaaatgtat	cgagggggcc	caaagattgg	ctcaggcggg	8220
acagaactcc	gccggtgagg	gcaaagccaa	aagccagtct	gactggattc	ccaatgatac	8280
gggattcaga	ggcgaaagcc	gggcttagcg	atccatcatg	tcctcactat	tgggggctgg	8340
tggtgacaga	aaagttaccc	tagggataac	aggctcgtcg	cgggcgagag	ctcccatcga	8400
ccccgcggtt	tggtacctcg	atgtcggctc	ttcccatcct	ggttctgcag	caggagccaa	8460
gggtggggct	gctcgcccat	taaaggggaa	cgtgagctgg	gtttagaccg	tcgtgagaca	8520
ggtcgggtctc	tgctgacag	gggcgtggtt	gtctgagggg	aagttgcccc	tagtacgaga	8580
ggaacagggc	agcgcagcct	ctggttttatc	agttgtccga	cagggcaagc	tgagcagcta	8640
agctgttttag	gataactcct	gaaagcatct	aaggaggaag	cctttcccga	gacaagacaa	8700
ccttccgtaa	ggagaagggc	ggccatagaa	gatggcgttg	atggaatgga	ggtgtaagca	8760
ccaagctttc	aagcgagggtg	ttcagcctgc	catcaccaat	agcccaacgc	acctgttgac	8820
aaaacaaaaa	aaaccgacag	acagaaaaaa	ttgaaaatct	ataactaaat	atacatattt	8880
ttttgttgg	tcattatttc	atgcgtaaag	agtcaattat	agaccaat	gatatatcta	8940
ctgattattg	ttatatagaa	ttttttaatg	gatattgatc	ataaaaat	agtatatctc	9000
atattatcta	ttaacaaaaa	aattattaca	atgggtttgg	tttcggatag	acaaagaaac	9060
gagacaatgg	attttataaa	aatctggga	tataacatca	gatataataa	aatagatcaa	9120
gtcaagtcaa	atgaaaccat	aattctgctt	catggtatag	gagcttccgc	agaacgatgg	9180
tcagaattag	tcccattttt	gtataattgc	aatataatta	taccagacat	cattggtttt	9240
ggttacagtg	aaaaaccaag	gatagagtac	aacatagatt	tatttgtaaa	gtttttggat	9300
gaattgtttc	tgaaacttga	aatcaaaaac	cccataataa	tgggttcgtc	ttttgggtgg	9360
caattgattt	tagaatatta	tttcaggcac	aaagactttt	ttaaaaaat	gattctagt	9420
tccccggccg	gtacccaaga	gagaccgaca	ctagcgtaa	ggcaatacac	ttactcatgt	9480
ttatacccaa	caagagaaaa	taccgaaaga	gcatttaaga	tgatgtcgca	tttcaatcac	9540
acagtaaaag	attcaatgat	aaaggatttt	attaatagaa	tgaagcagcc	caacgcaaaa	9600
cactcgtttg	tttcaacact	tttagcacta	aggaaaaata	gtgatttaca	agacaacctg	9660
agggaaatca	aaatcccaac	tttagtaata	tggggaaaag	aggacaacac	cattccagta	9720
gaaaatatag	agtatttcag	gggcatccct	tttgtaaaaa	catgcataat	gagtgattgc	9780
ggtcatgtgc	cttttgttga	aaagcctctt	gagttttata	aaatagtcaa	agagtttatc	9840
gactccta	ttctaata	agtattatat	tcaacattaa	aatattattg	aatcaatcca	9900
cttctatgag	taatgagaat	gaagaaaata	aagatataga	ttttaagaaa	tccattgaaa	9960

aggctgcgga attccagcag gatttggtgc gacagttctc tacaattcaa tacaatgcgt 10020  
ttcagaatat gttttcatct ttgcaaggat ttacaaatta taatgccatg tttaaaacca 10080  
ccgtacagac ggggtggcagg atctcaattc ccgaagcaga aagaaatgct ttggggattg 10140  
aagaggggtga tctagtccag gttataatta taccgttgac aaggaaaaag aaaaacacaa 10200  
gttaaaataa caaatccgtt aatgtgtttg aatccatttt ccaatttttg gtaaaacatt 10260  
tttctgtgaa aagttgctag caattagccc tacatgccct gttggaaatt tcatcaggct 10320  
tttatcctga cttgaaatta ggttggttag ggagctactg ctgtcagacg ttacaagggtg 10380  
gtcāaattca gctacaacat taagaacggg aaccttaatg ttgacaaat ttatcttggt 10440  
ttcacccaca atcatcttgt tttttgcaaa aaggttttgc tgatagatat cttttaccca 10500  
ttgcctaaag gtttccccg caataggagg tgtgtcatac agccatttct ctattcttaa 10560  
aaagtctgtg acaaaacttt catcttcaaa gtttttaa atattatagt atttgtttac 10620  
accttgcttg aatggtttta gtgatgcata aaccagatac agtaattcat atggaaggtt 10680  
ttcgtgatag gacagtactt tgtcaatata catgtgtcga gccatgtttt ttattacgga 10740  
tttgtctttc tcggcatcaa caattggagc aatggtgact agatttttaa tgttttttg 10800  
atatagcgaa gtgtacatca aggacattgt acccccatg caatatcctt gtaatgaaat 10860  
ctgatcaatg ttttctatgt tttttatgta ttctacacac tcataaataa acaaatgac 10920  
ataatcatca acagtgatgt atttatccag ttttgacggg ggtttccagt caatcagata 10980  
gacatttatg cctgtctcta gcaggttcct tatccaactt ttgtcgttct gcagatccaa 11040  
aatatatgat ttgtttatta atgcataaac aatcaacaaa ggttacttga aagtttggtg 11100  
ctttaggggt ttataatgta gtaaaccggaa gaggggtgtt tcccttatta cctcatattc 11160  
gcttgatcca gtctttatgt tttctatatt cgacaatttt ttcctgattt cttttaattt 11220  
tgaaatgtta tcaggatccc ttacaaacgt aaaataatca ttcactaaat aattaattaa 11280  
ggaattattc attttttttc tcatttaatt tttttttgat ttccaatgat atttttttga 11340  
tttcatagag attataaaat aacaggtcct tttcttcttt tgacagttgt tgttgtagacc 11400  
taaacaaaac ggcatttgaa tcgtaaattt tttgataact tttgatgaca tcaatgctgg 11460  
aattcaataa attgttataa ttgattgaaa agtctgttga ctgcaacatt gacgagaaca 11520  
catcctcaaa agtatttatg attattttcc taatatcgtc ggggtttttt tcatctatag 11580  
cagacgatac cttgttttacg gccacaaat aagcatttat catacgggaa aagtataggt 11640  
tgagaaatga ctgatatctc agtaacaaat taccgtgttc ctttaatgta tttaaattaa 11700

ggtttgatc attcattaaa gaggtgaatg gcccgaagg tgaaggcta tttactctg 11760  
ttaattgttt tataaagttt tcaaatacag actgaagtcc tgctcttca gatagagtgt 11820  
ttttactgtt ttttctctt ccaatattgt tttttctaa ttgcaaatga ttgattcacc 11880  
tcggattcga aactcttgta attgtaataa ttttcatca acaatactat attctttact 11940  
ttttgtcatt ataaactttt tttagggtta ggaagaaatg aaattttattg tcatttaaca 12000  
aacttgaaaa gcaattatcg caggccaagt gtatgttaca ttgacaattc ctttttagtag 12060  
agagcagttc ctaaaaactg tcaaaatgga cggatggtaa aaacccattt ccaggcaaaa 12120  
gcgcaactgg aatcagaaag tgtttattcc aaagtttgac catccctctg gactctattt 12180  
taacgggtct gataatttta ataccctcg gttatacaaa atatggcaca tgacactgat 12240  
ttaatgcttt tatgctttga ttatcacctt tttatattga aaaaacgact catgcattaa 12300  
aatagtaaaa ttattctaaa taattttaga tattcacatt taggcaaata attagaagat 12360  
aaagccaagg caggcccaac aattttataa ggtaatccta ccaagacgac tgggggtccg 12420  
tagctcagca tggatagagc gcctgccttc tatctttacg ggagatagcc ggaagtcgag 12480  
ggatcgaagc cctccgggcc cgtaacctt atgggggttca aatatttttt cagttctaata 12540  
gcccatagaa ggagtatgaa tggacacatc attgcctgaa gtaacaaca accatcacia 12600  
aatgaagaa gagaaaggca taattagtig acgaatgtga tgtcggagt cttttattgt 12660  
ttggccggtg tctacgcgtc agaaaactgc caaaacgggc tgctcgaggt actggcaaga 12720  
catcccgaac agccttgtga tcttcttttag ccaactgaaaa acatgatggc gtaaggggct 12780  
acctoccttc agcgatatat cgctaaccgc actgcacttc cctagcggtc agatttcaag 12840  
tacacagcca tcagtagcct ctaccctgta cgogaatgac gatattcctt gttgcaaact 12900  
tttgttctga atgacatccg tcgcagtatg cagcactagc caggcgtatg catccttcag 12960  
atcgccaaag caaaagtgga tgtattcggt accccttcca tgtgagcaga cgtccctcac 13020  
attgtcactt gcactcctgg gcgtggggcg ctagatttgg gttgccagat aatcattgag 13080  
ggcccaaagg cggggtttgt ttctgggtgg ccgggcataa ttgcaaaaa aaggagaaaa 13140  
agaacctgac ccttgtcaaa aaatttatat ataggtagag atggttgtct atttttgtat 13200  
acaggcacat gagtaattac ccaaatatta tctatggcga aaccatatat agaaacaatg 13260  
agccaaggca gacatttgcc aaaaccattc gtttgtggat ggattctttc tattgtcccc 13320  
cacataacct tcttcccgag gctgatacag catcttagtt tttgggtatg cgcatacccc 13380  
cccaccatgt caaaagaatg tatacatacc accgctgggt tggacatgta taaaacatct 13440  
gaactttagt gcatgtctca tgcaatggc catatggacg atgcggtgac ggtggatttg 13500



ccttactgct gcaaaaactc aaacaaggta ggccccattg gaaggacagc atgttctaag 13560  
tcggggaaaa cggggcatgc gggtcatttt caggaggaga gtaatatccg tagcccatg 13620  
ccaaatgctt gcagtctcaa ggccttgatt tgcgctctgc gcgtttgttt ctttttgaat 13680  
acttaactta aggtctgggtg cctgttacag ttgatattcc accatagggt gtagatgcag 13740  
agttattgct attatcagaa gtcggatttc cgggtgtctt gaaatcttgt atggagttag 13800  
tgtgctttgc ggtaccatct atcttaacca tataaaaagc agcattgaag acaactgtgg 13860  
tggaattaat atttgcgaat ttatatacgc caacaactat ccacgcagga tgagttgaac 13920  
taccattgtt tgttgtgctg gttatagccc tatagcccct tttatatcat tctatcaagg 13980  
tttgtaggat tttgtgaatg gcatatttga atctggctca tcaatatcac aatggcagaa 14040  
attattacta ttgaagacaa tgataggagt ttatgtttat tgccatgcat attaagaact 14100  
gaattaaaaa catggcatat aaaattctat ttttgtgact gggataaaga ataacatatt 14160  
ttgtgttatg ggtcactctc aagaattgag actcatcata gttggtgttt ttggttttag 14220  
aatcaaaaga agaaaagaac aacagcaata caagttcaaa aagacgttac ccgatcgcta 14280  
atgacaatga tttggaactt ctttctattt ttaactattt tgattagggt acagattcta 14340  
ttgttgtcat tacatTTTTT gccactgtct gccagtttgg gagttggaaa ctgacctttt 14400  
ttccttcagt cgcctttttg attatgccat atttatttag catttttacg cactcttctg 14460  
caaacagggt ggtttctcca tattctatta gttttatgtt tgtattacca ttttttaagt 14520  
atagttcttc aaaaacgggg agtttccagg caacagtggg aacacacgaa actaaggcct 14580  
cagccacagc aatgccaaaa ccctctctgg atgatggaaa aataaagact ttagatttag 14640  
aataaaggct aatcttttct tcctcggaga caaagcctct gtgatctata cccgcattac 14700  
gtagttttgc agccttatca gggggtatgc gcccaaccat tacaaaatta gattctggtc 14760  
tgagtgtttt tattgcagtc caaatttcct ccagtccatg aaatttttct atccttccga 14820  
tacaaagaaa atcaatgtcc tttttattgt tgattactcc tctgttgga tcttttaaaa 14880  
agatattttt atctattcca gttcctacaa tggcaattct gttggtcaga ttttttgcta 14940  
attccctgggt tttttatttt gctgtttcct tcaaattatt gattttgcta acccctattc 15000  
catagactgt gttgagttca tgccttgacg cttgactcac ggtcaaaatc atatcagaat 15060  
cottaagcat caccgcagta gccttttgta ttagataatt gtacagaaat tcaaaatagt 15120  
tcttgcaaat agatatccgc ggttcatggg gatgaaacac aacaaagatc ttggtttttg 15180  
gcttgaatag cctaagtagc agccaaagga caatattaga ttcgcccac gaatccaaaa 15240  
tggcaatate tggacgtttg gcaaggggcc gttaaagcat tgtatgtgtc gggtataatc 15300

ctatttggtta ttttttttgc ggagttatgg ttgtatatct tcaagacaga atagcagccg 15360  
cttttgtcta tcaggtctgc aacttttttc atocagagaa atcctccggt gtaattcttt 15420  
aaacttgaag ggtaaccaa gaataataat ttaatttggt ttgcgttgct ttaatcatc 15480  
ctcgttggtta tatataacta taaagaacac ttattttata attggtattg ttaagaacaa 15540  
  
gataatcaac attttggaca aacatgataa aagaattgaa aaaatgacac aataaattaa 15600  
aatatttgga taatcgtcat ttacccttca aactgtgga cgatgcaaaa tatcgttttt 15660  
gcagtattca tatttttctt tgcgcatact catgaaaatg aggtttggag gttcatcagt 15720  
tccttggcaa tatgtttttt gaaatattct ccaaatacat ctgtatatgc ggctccaaac 15780  
tccagatttg ttccctttca aaaagatgcc catatctttg tgagctgccg ataagctccc 15840  
tttttttcaa ttgtccaga taactagaat taaccttggga ttccgtaaaa ccatttttca 15900  
tggccaaaagt attgaggggtg ttgtgtatcc cagaacctg ctgagctgct tcctttatct 15960  
tatacgctat ctcttttggga atccctagtt tttctgcaag ttgcggtga accctttttc 16020  
ctaggttgtc atagttattg ccattgtttt gaatattgag tcgcggatct attctcagta 16080  
ccgtgtctat cagattagta tctaaaaagg gtctgcgtaa ctctatgctt tgagacatgg 16140  
ttattttgtc ctctctttcc agtggttctt tgtaaagtaa cttaatgtcc tctatcaggt 16200  
atccctgaat ttttctgtat ccgtgttttt taacaatttt ggaataccag gaatatccgc 16260  
caaacagttc gtctgcccc tgacctgtaa gcattaccgc tttccctgt tcgtgagcca 16320  
atttaaccgc gccatatatt ggaatggcaa cctcaacctg tcccatgttg tcatcttcaa 16380  
ttatgctgat tatttttggga atggtacttt caacatcact ttcagtcac tgttctattt 16440  
ccaacttgag gtcaagtttt tctgctatct caagtgagtt gaggatatca cttgaacctt 16500  
taatcccaga cgtatagcaa ataacttcgg gggccatttg ttttgccaaa tacgctacaa 16560  
ttacactgtc aatcccaccg gagaaaacaa taccgatttt tttaaagtca ctcacacggt 16620  
ttctcataga ttcaaccaat gtatcaccat atgcgttaac cgcagaatcg atgtctgtgt 16680  
acaggattga atatttctca catattgatt tttttgtatt tacagaaatc ggaaacaatg 16740  
tagtcttgaa attggaggac ccttccttcc gcgaaatgac aagagcatag cctggcaaaa 16800  
gtcttttgat ttggtcggac atagcaattt tccataaggc ttttctttct gatgcaaatg 16860  
caatgaaatc actactttca ccatagtaaa tttgtcttac tccaatgcca tcccgtaacca 16920  
gcacaatatc tcctgtggac tgctctctaa tcgcaaaaac ataaattcca tcaagctggg 16980  
taacggttct ccttatagct tcgattagat cgcctttagt gttttgataa tgggtcttcaa 17040  
gaaggtgaac aataacttca ctatcagtcg aggtagtaaa agtgtgatgt gcagaaagg 17100

tctttctgat ttctttatag ttatatat ttt caccattatg ctccagaatg agttttttat 17160  
cacaactcac aaacggctgc tgaccacagg agccaccaac tattgccaaa cgactgtgac 17220  
ctaaaacgtc atgcccctct acctgtgaaa acaatggatt atcaaaggta tcagaataaa 17280  
ctatttgatt ctctgtagac aaacccatgc catccggacc ccggtttttc atacaggata 17340  
gcatttttcc tatcaagggg gcaacatttc tctctttttt acttaaaatt ccaacaattc 17400  
cacacatctt aaaattttcc tatacgggtat ttattgatga acaaaatata aaagtaacca 17460  
ctattgttgc cattatgggt tctaaacgggt tctactctat aaaatcaagg acaccaatca 17520  
tatccgggtgt gtttacctta tttattgttt catttatata tttatcctta ggcatatatg 17580  
cgatacctat tctgcctgc tttatcatgc acaggtcacc tttagtatcg ccaatagcaa 17640  
ttgtatTTTT tatgtctgca cagattttct ttgcatggat ttccatgtga tatctcttac 17700  
acacagaatt cttgcaaaaa cagtctattt tttcccatcc taacggcata tttatttctc 17760  
cgggtgactat ccattgtct accttcaatt catttgcata aaaaaagtcc aaatcaagtt 17820  
tgttcaccaa ggcctgagca gcaacactgt aactatctgt aattatccct attctgaacc 17880  
cttttttctt cagcaaagat atcacctcct ggctgttctt tgcagggggg atggagtcca 17940  
aagcaatttc tatttccctt tcttctatcc ccctaatacac agcggctatc ttctgtgtct 18000  
taacatagcc tggaatggat ttgtcggact ggatgtgtct gacctgagca tacaagccaa 18060  
acttttttga caatacctca attagccttc catcaattag cgtcccatcc atatcaaaaa 18120  
cggccaatgt agatttaaat tccataggat acaacaaaca aggaatgtca aagaatatta 18180  
ctatttagcg acagcctatt agccaaaatg tttttatagg ttggggacat cattattcaa 18240  
ttgggatgtc ttgggcacca atttttttat ttcatlagat atagccctat aaaaaggtta 18300  
cattaaaaag tggtcgttag atcaatttta tgtatgtcat ttataaacga atatgcacat 18360  
atagaaatat aaacacatga gattagatta tccacctaac tataccgaga ggataggagc 18420  
agttagtatc catgcgcttc aaaagattta tgagatcgat tccggaaaga tgcccaagtt 18480  
taatggcctg catcagcatc agtctataaa ggccttttgt tatgacgaac tgtcaagcat 18540  
attccaagaa cttgccatag tcattccagt aaagaacgaa aaaatcagcc ttcttgaagg 18600  
agtattgagc ggtattccaa atgaatgtct catcatcata gtttccaata gccaaaggac 18660  
tctgtcgcac agatttgcca tggaggttga aatggtaagg cagtactcta gttttgcaga 18720  
caagaaaata atgattattc accaaaatga tctgagctg gctaatactt ttaagaaaat 18780  
aaagtataga tccatcctca acacaaaag tcaggttcgt agtggaagg ctgaaggaat 18840  
gataattgga atattgctgg caaaaatgca cctaaaagag tacattggat ttattgacag 18900

tgataattat tttccaggag cagtaaatga atatgtcaag atctttgcag cgggatttgg 18960  
 aatggcaacc accccataca gcaatatcag aatatcgtgg cgttccaaac caaaaatcgt 19020  
 aaacaactca ctacaattcc caagatgggg tagaatttca gaatccagta acaaatacct 19080  
 gaacgctcta atatcccaca tcacagggtt tgaaaggagg attatcacga ctggaaatgc 19140  
 aggtgagcat gcattatcca tgtcccttgc agaaaatctc aactattcaa gcggatattc 19200  
 gggtgagccc tatgagttta tcaacatttt agaaaagttt ggaggtctac tcccatcaaa 19260  
 caatcctgac atcatagaaa agggatatcga aatatttcaa atagagacca ggaatccaca 19320  
 ctttcatgag gaaaaaggaa atgatcattt ggcaggcatg atgcaagaat ctcttctcgc 19380  
  
 aataaacaac agcaaaattt gcaaacacaga actgaccagg gaaataaatg accatttact 19440  
 catgcttcag gtaaaacaca ataatgatat gaccaaactc aactttaaga aaaaacacct 19500  
 tataatggat ccataaaaa taatacccat cgacaaattc gccgaatttg tagttaagaa 19560  
 ttctaaaacc ttcattagaa ttggataaaa atatgcagga atgcatattt ttgagaacaa 19620  
 caggtttggg aaattttgac tgatttttta gatccctcaa actgcacctt tatccatcct 19680  
 gttttatcaa gcctgaccaa gcgaatgcat aattatccga ccgtgttttg agcaaccaca 19740  
 gaggccactt tttttagaaa caacgtaaag ggataaaaaa cagttgttca ccaacatttc 19800  
 actagctggg gaataaatta tatcttcaaa cttttattct ccaccctac aaaccgaagg 19860  
 atcacagtac tcgcccacg ctacctgaaa aaaaataagc aatagtcagt ttccgatttc 19920  
 aaaatttcaa attttcaga gaattaattt tcccctcatc atcaatgccg tcaattactc 19980  
 tgaagggtat tttccagct ctttggtatt tttgtttatt acatattttt ctggatcata 20040  
 tccatatttt ttgcctaact cattcatgta ctctgaaca tcatgccaag ctttttgctt 20100  
 gtcatatgga ttgccattta ggctgctacc tccactgcc aacgtagatt ttgatgaagc 20160  
 atccaatgca gtttggtata gctttgatat cttgctaaat tcctcatcag tcaaccttat 20220  
 atttttatta ttgttgttac tggtcattta ttattacccc attagtaaat atttgatgtt 20280  
 caaacttatc tttttctttt gataaaatgg agtcagcctt tgtagcacat tttggatatt 20340  
 aaaccaata cgacgcgtta cggaaaagat aaaagcacct aacacccttc aaaaacattc 20400  
 aacgatatga ctgaaagtag ccaaagaatt tgagaatatg ttctttctca tttatcagag 20460  
 actttttgtt tgggtttata attaattgat taacgttctg attgataaaa aagcgcaaaa 20520  
 tagcaaacca tgtaaatgtg aaaagggggag tacatttggg tatggcttaa caatactgtg 20580  
 gttgtctcca aaatagtaaa ttttataatc taaaagtaga aaattcccta tgagtgatgc 20640

tatcgaaaat gtcctgatcc ttcagggagg aggatctttg ggtgcatttg gttgcgggggt 20700  
ctacaaagca ctagtaaaca ataacataaa acttgatatc ctgtctggca catcaattgg 20760  
cggtttgaat gccacagtta ttgccggcag taaagaagat cgtccagaaa aatcattgga 20820  
gaatittttg atggaaatag ctgatactaa taatggtaat attaatacat accttaattt 20880  
ccccTTTTT gaaagtccct ttcttgggca aattcctttc ccttggcat cagaatcaac 20940  
actatcattc tacagctctg ccatttatgg aaatagaaaa atctttctgc caagatgggg 21000  
acctgaaaat atctttaaag atccacagta tttcacacct agcaaattgga catatttgta 21060  
tgaccattca cctttggtaa aaaccttggga aaagtacatt gattatagca aattacagcc 21120  
aaacggtaag cccaacgcaa ggctaataat aaccgcagtt aacgtgatga cggcggagcc 21180  
ccttattttt gacagtgcc aagcaaaaat aacccccaaa cacatacttg caaccactgc 21240  
ctatccaaca tatttttttc aatgggtgga attggaaaaa gggctttttg cctgggatgg 21300  
aagtttacta agcaataccc cgctaagaga agtaatagac gcatcgcccg caaaggacaa 21360  
aagaatcttt cttgtcgaga actatcctaa aaatattgaa aagcttccgt caaacctaca 21420  
ggaagtcaag catagggcaa gagacataat gttcagcgac aagaccgtcc acagtataca 21480  
catgtccaaa gcaattacc ttcaacttaa gcttattgat gatctgtata aaatgctaga 21540  
gtattacttt aattcagaaa aaatcgagga aaaggagaag tttgaaaaaa ttcgtgcgag 21600  
atacaaaaaa gtttcagaag aacacggcgc agagattaaa ggtgtctact atataacacg 21660  
ggacgagcca tccccctccc tttatgagaa tgcagacttt tcaaaaaatg caataaaggc 21720  
atcgattaat gatggagaac aaaaggctga caggataata aaagaaatcc aaacgaaagg 21780  
aaaacgaaaa taatgagcca gaaaacacca accaagttgc aatttcaaca accatttttt 21840  
ttatttggcc tgtattcccc tttttgtcaa aatttttttg caggccaaaa tccaaaccaa 21900  
aaggaaaatt cctaattgtc gcaaatttta tttgaaagtg aattatccat attaccatag 21960  
agaggcaaat ccagttcgcc ataaaatcct aaacaaaaca atactttttg atccctgcca 22020  
gaaaagcaac atcagctatc tcagatgtat tggactgagc gctgccatac cacgcgcaac 22080  
tttgaaaaca tcgccacacc cataactctt ataccaaatt ttttaccaac agaaataaca 22140  
catgaattaa aaccaagaa atcagcaata taccattttt gcaaagtcaa ggcatttttag 22200  
gtaatcgta ataacaacaa taacagatta tacagtaaga tcattttggc aggcctaaaa 22260  
aaagaccgtt ttatttaaga aaaaagcaat tctcgttatg tgggtattat cattgacgat 22320  
taaccaaatt aaatcaggtc aaatcaggtc aatgactttg cctatttgat aaggtgataa 22380  
taccttaggc caaacaatca gcaatatcga ttgttttttg cattaattat ctatttttta 22440

tattttctttt aaaaaacgaa tagaaataat caaatatgtc caaactaaaa tcaagaatta 22500  
gaaaaatccg tgacagttat ataatatgtt aataataatc aactaatgac aagttcaagt 22560  
gaaaatagta gtgataaaga atttgaagag ggcgcagcag gcacaaataa agatagaaaa 22620  
agtgatccat tgaaagagta tgaaagtaaa gagccaatga caccagcaaa aataaatgaa 22680  
ggagaaccaa cggctgtaaa gagagacca tcagaccaa agataacagg agaaggtcaa 22740  
acaggagcag ataccgaaca agcagatgaa caattgcgta aacgtggcat gacccaaaatc 22800  
gattctgatt cttctaacac atctcaataa tcaaaaacaa aataaaaaga ataggatact 22860  
tcatatcaat atctttatct tttcttttgt gacgcctttc acccggcaca aattcattat 22920  
aaactaatcc aatgcttcg tttcttgatt gtccaatagc aataaacagc gattagcaaa 22980  
ccaacatca acggcatcaa acatcaaaga aataaaaagg tgtgaaaaaa tacataacga 23040  
cttgtcgta tacgaaaatg aaaatatgta ttaaatctct tccataacta gatggaaatc 23100  
taattttacc ttcaccgata ccattgata agaatcatat ttttctttgc gcattgttat 23160  
tattgtgcat agattgatag aaatttacga cgtaaatat ccaggagggt gctatatggt 23220  
  
caatttttga atttgaaata ccatgtgctt tatataaaat atttcacgat atatttaaaa 23280  
attacaaaaa aacatcgttt gctcgtcatt aaaaacgcaa aaaaacgggc aaaaaaata 23340  
ttatatgcat tatatataga atattgtccc tatagtgttt acaatgatac ataattctaa 23400  
attaacaaca acccttattg ctttgcttat tgttccaata attccaatga tgaccctggg 23460  
aataattcca gatgtgattg cacaacagaa cagcagagga attgcagact tgactgaaag 23520  
caatggcggt ccagatgctg ccgttggcgg cagtagtggc accaacagta gcatagggtg 23580  
taacactagt ggctcaagtg aaactatgag tggtataaac ggtggcgaag gcaccgtaga 23640  
caaatttcaa tgaggcattt tgccaccct caactttatt aacggccaac cttgccgtct 23700  
ataagtgatt tgtgacacct tttccttttt attattgtta ccttagttga tatcgaaaag 23760  
agactgtatc caaccattta aaatatttggt ttattatggc gggttcaggc ctaaaaaaag 23820  
gaactgcagg caaatagggt tggcctgatg ccactttttt tggtttgcct caataccaca 23880  
tctattatct caactccaca aaaacattta cagggatgcc atttgctctc agtccaatcc 23940  
taatccttcc ctgctcatat tcaatgtccc caatactatc ttttaatccc cttgaagcaa 24000  
aatgtaaacg attacttttt agctttacct tatatgttcc cgttttttca ttatgggctg 24060  
cagacacaaa ctgtatatct tctccgtcaa ccaactcata aagctcccta caaacagggt 24120  
tgattacctc ccatgtttct ttatctgtta aatccttgct caataccata aacgggtgct 24180  
tcctattttt attgtttaga tatatttgat tatgatatgc agtaaagtat atttctttga 24240

caaattttaa atcgatttgc tctatttggg taaattataa aatcatacca acaataagga 24300  
ttttcacaga tgatttgatt ttcacggtga atctgcccag agggatttca aaaggattgc 24360  
cagcttatag ttttgtttaa acatttatgt atttaagtag gcataatcag ttagttactg 24420  
tggtttcata cacctaaatt tttgccatat tgtattaaca aaattacggt aaaaaaacgc 24480  
cacgcaataa atcacttaaa atgtaatacc tactttccta tattgccttt ttcaaaacgc 24540  
atttaactcg ttattgagaa ctattaatgt tgaatccaaa tggaacttaa cgcagcagta 24600  
attgtgaaac tcgagccgga tttttctgaa gggaatgtaa gotataattc agacggaaca 24660  
cttaacagag cagaaacaaa aaacattttg gggccccata gcgcagcagc atccctagca 24720  
gccctgtact caaaaagtaaa acatggaacg catgtttctg tgggcacaat gggctctcca 24780  
atagcagaat cggccttaca gcaatctcaa ctgatttgcg acgctgatga actgcatctt 24840  
tatagtgatc gcctctttgc aggagccgac accctggcca cagctgaagt tttgatagca 24900  
ggaataaaaa aaatggcaaa tggcgaagat gtggacattg ttttctcagg gcacagggca 24960  
tctgatggcg aaacagggca aacaggaccc cagacagcat ggaaattagg ttatccgttc 25020  
cttggaatg ttattgatta cgatattgac gttgtgaaga gaattgtaag ggtacaacgt 25080  
ctaatacaaga tttacggtca tctgatatt atagaggaga tggaggcgcc tctaccggtt 25140  
tttatcacac tggacccatc ctacaatccg tcttttaaca cggtatccca aaggctcaga 25200  
ctagcacgaa acctacagga agcccatgat agatcacaaa ggtataagga atatctcaaa 25260  
actttcaatg ccatggaact agaagtcaat ccaaagtctg tcggactgcc tggctctccc 25320  
accatagttt ataaagttga aaaaatacca agggcaaagg caaatagaaa agcagatggt 25380  
gtggatgggt ctaaccagga tagtctaagg caggttgcaac gccgaatcca tgatgtttta 25440  
gggggtgtag tcataaagt acatcatcac tatctgccat acctgacgct aaactagacg 25500  
aaaggccaaa ccaaatgcc catgttaatg acaaccaga aaaagaaagg ggagacaaca 25560  
acaggcatct gtatgttgat atagaacaag aggaaggcac catattacct gtgagttttg 25620  
aaatgcttgg tgaggcaaga aggctaattg atgattttta tcacaaatac aagccagagg 25680  
aaaaagtggg tgcgattata ctgggccata acatcaagca cctgtgccag gaactaatcc 25740  
accatggtgc agacgcagtg atttatgccg accaccgga gctccgccac ccaagaaatc 25800  
ttctttatac aaaggttgct tgccaaattg ctacggacaa agagagcgcc gccagaattt 25860  
ggccatcaaa tcccgatatt aacagacccc gttacatggt tttttccgca gatgacacag 25920  
gaaggcattt atcatcaacc gttttggcag aattgcaatc agggctggca tcagacataa 25980  
acaaacttgt tatcaatgat ttagaaataa ggcatgaaca caagacaaag ggtaaaccga 26040

ttgtctatga aaagacactt gaaatgtaca gaccagactt ttcaggcttt ctttggacca 26100  
ccatactctg cttggataat ataatcccg agaacagaag gaaattccat ccacaggcat 26160  
gcagtataat cccaggcgtc tttcccaaa tggaaggaga tacggataga aagggtacca 26220  
taatagagtt cagcccaacc atagcccagg aagaccttag aataaaaata atcaacagaa 26280  
gagtaatcaa aagcaaagtc gatttttagca ataaaaaat aatcgtagt tttggaagg 26340  
gaataaagga gtctcccgaa caaacataa aactgataga gaaccttgca aaggaaatag 26400  
aagcagaaat aggaatatca ctgccattt caaagaaacc ctatccaata agcgaaagtc 26460  
tgtcgtcaac ctatatgatt cctgacaggg ttatcggcac aagcggaaga aaggtaaatac 26520  
ctcagggtga ttttgcaata ggaataagcg gggctgtcca acacatagcc gggatgaaag 26580  
aatcggaatt tgtgatttcc atcaatccag acagtgaagc tcccataata gatgaatccg 26640  
atgttttaat caaaggaaaa atcgagcagg tgctgcctct cctgataaat gaattaaaaa 26700  
aatacaaaga gagactgcaa ataccacagg agatagaatg acaatggaaa gttttgatgt 26760  
ggcgataatt ggtggagggt ctgctggact tgccggcactt gagcacctct ccaatttggg 26820  
aaaacaggca atcctcatag aggcaggaaa aaaaatagga accaaaaacg tgtctggggg 26880  
catattgtat tccaaaaaaa cagcaactgg aaagggtccac aatgtagaag atgtgtttga 26940  
taattttctg gcagacgctc cgctggaaag gaagataata aaatacatgc ttcacgcgt 27000  
ctcaaggga aaagcgttct ctctggacct gactttggca cagactatc aaacgaattt 27060  
tggttacacc gtctgtctca acaaactact ttcattggtt gcaagggaag catctcaaag 27120  
tgcagaaaaa ctgggtggag ggataataac aggtgtccat ttaagggtcga taatctggaa 27180  
agatgacagt accataatta tagagacaga tgaacttgag ccgttccagg taaaggcagt 27240  
cattgcagct gacggggtta actcagaggt tgcgcaaata acagggtcca gaagcaagtt 27300  
cacaccgtct gacctctacc agggcgtaaa ggtggtggca aaattaccag aggggttgct 27360  
tgaagagaga ttcggggtct cggaaaacga gggagcggct cacctttttt caggcgacat 27420  
aacgctaaac cacattggag gagggttcct ttacacaaac agggacacca tctcaattgg 27480  
cgcagtatac cattatgact ctctaattga aaagcctaca gagcccaatg cgctgggtcaa 27540  
tgcgttactg tcaaatacgt ttgtgatgga attgataaag gacgaggttc caaggatcaa 27600  
ggaggactac agggatcttt caaaggatga agaactaagg attaggttca aatccaataa 27660  
attgataaaa agctggaatg acctacacca cacatattat tcacatctg ccgttgcaga 27720  
gcttgtggcg cagggaat acaaatcaag ggaggagatc aaggacaaaa ttgattcatt 27780



gtacaatgag cttgtaacaa aatacaacac agaatttgaa acaaattacg tggagttaga 27840  
 gtacagcgcc aaactgggtc cagatggaaa aagggtgcaga atgaaaaaac cctactttaa 27900  
 aaacatctta tttgtcgggtg atgctgcggg caggggcatt ttccttgggc cacgcataga 27960  
 gggcctcaac gtaggcattg atgacgcggt tagggccgca gaagctgtct caaagtcaat 28020  
 agatcaaaat aactttcagt ttgacaacat tgggtgaacgc tacactaaat cagtggatga 28080  
 aagtccatat accgcagaca tgagcaggat cgacgcaaac tatctcaaag ccgttcttga 28140  
 ttgcacaaaa aagggtccca aaaacactct tgggtttaag tatgggtcta ttgtcaaatt 28200  
 gatgtcaaat agcaccttta ggaatgtatc cataggaatt gcaaactcta tagggtacaa 28260  
 aaggctttta cctgtgattg agtcagacaa aacctacaat caaattccca tcgagattgc 28320  
 ggagagaaat ggcaaagatt tgcggaaaag ctattccata gagattccca ccattgccga 28380  
 gcgtattgct aatctgaact ataatgacga ttcactgtca cacatcaagg ttttgaactc 28440  
 gcaaagtgc tttatgaaaa aaatgggtcca actgtgccct accaaatgct acagtattga 28500  
 gaatgagcgg ataatgctac agcacgaagg atgcatagag tgtgggacat gcgcaagaga 28560  
 aacagaatgg aggcacctc gtggggaaaa aggaataatc tataattacg ggtaagccat 28620  
 aaccggaatc catcaacata tcctttctgg aaaaaagtc ggggataaca cacgcaacaa 28680  
 aaaaaacaac gaatggattt caggttctaa atttttgggt gtttacacct tatctctgct 28740  
 ttaccgctt ttattttttt ttgatggat tctatttctt caatcaactc atcaacatac 28800  
 tccctgattt tttcgtggct ccccgataac cctccagccc ctgcatactc agttagagaa 28860  
 tcagtttggt tccggatcac tgtctgcatt ttttcatcaa gctcttcaat caactgtatg 28920  
 attgacggaa taagcctctc catatgattg gtaaagccac caacaattat aaagcttacg 28980  
 cagtgtatta atgcgtatta cagtctatat gggtataaac aaccaacaa aatccgaatc 29040  
 aaaagtaaat gaataacaca taatactaca atgggccatg aaacaaatta catcaaagcg 29100  
 tcacatttta agcaacgtca actgctagtt ttgaaagtta tgtatttctt tagattattt 29160  
 tctattctat tttcattggt gtagttgggt gttgcagcag cagttgttgc agttgccaaa 29220  
 ctcatggta ttttccttca tcgttttttt ctggcatgtc ttttgcggc atatgggaag 29280  
 gcaggagac aggtatgaca aatttgaatg tggcgctat ttttccttca ctgccaaagt 29340  
 ggtgcagtat ttcataaatg ccttcgtctt tatctttagt gttgttctg ctgctgctgt 29400  
 tgccgccctt gctgtttgtc tcctcaaacc atatttttcc accatgctcc tcaacaattt 29460  
 tccttgacag gtataggcca aggccggttc cctggtttga ctttgtgaca aatttctgaa 29520  
 acagctgac ccttattttg gagttgagcc caaccccggt gtctgcact gtgactagca 29580

ccgcgccttc tttctgcctc ccgatgtggt caccaccatt gtcaccacca ccgttgctgc 29640  
 tgctgctgct gctatccact ctgcccccat tgcctttacc agctgtagca gtgtttgagg 29700  
 tatcactttc ctgagagggtg gaagtgaagg gagaagactc acccatcact gccgtggaaa 29760  
 caacaatctt gccgtcattg gtgaacttca ttgcgttgct cagcagggtg aaaacaacct 29820  
 ggcttatctt ttgcggatca cagtctacat aaaaagggtg gttggggcca ttacggggtt 29880  
 ctaccactg ctctttttgc tgcgtctctt tttgcgcctg ttttgctcct gccgtgcct 29940  
 ttacccttc tgcttttgcg ccgccgccac ctctggagta ccgccattt ctgttgccgt 30000  
 cagatggcaa aaacactatc gccaccttgt ttgccttctc cttgtaggcg tattttttct 30060  
 caatgtctc tatcacctgg gaaatcagg tgtggatata cacatTTTTT tggatgtcca 30120  
 ggctaaagct tccgctttcg attctgtca cctgcagaat gctttcggca aggttctgca 30180  
 gccgggagcg gtttcttggt atcatgtcaa gctcccgtg aaactctgtt tttctttgc 30240  
 caagcttctc ctccagtatc tccacaccgt ttaggatggg catgattggc gttcgcaact 30300  
 catgcgagc cactttatg aactcgctt tgactttgtc gttttggtca agctgctgga 30360  
 acaggacact ctggtcatag aggacctcaa atatggacga gtaagacaat accgttggct 30420  
 cgctgttgga gtagattgaa aagccgattg cggcggttg caccctctcc cttgcgtgta 30480  
 tcagctccat caccagcgac tctttctgt ccacaaccag tgtctttatc ttgatgccaa 30540  
 tgcttgggcg aatgtcttg acttggtgt tgggcctgta ttttgtagg agcctcaagg 30600  
 acaaggactc tgcactgag gcatccatcg gcgtgaggat gttgatctc aggtgtcgt 30660  
 tttgctccac catctcttc aagagttgca gtgtgccgc ttttctctgc aggtggaacg 30720  
 cgtaaacgt ggagtaatt atcagtatct cccttttggc cctgcttata atttcaaact 30780  
 ccctttggac cgcgtccttg tagttggaga agaccagtga gacgggcatg acaaccccat 30840  
 cctccagctc ctttatctg tgctctgcg gcaacgcct gccccaaaag ctgtcaaaca 30900  
  
 caaactgctg ctgctctgca atctcaggga ggttgctgaa caaaagctgg ggtattgact 30960  
 gtgccgcatg aagggtggcg acagccacat actccctctg gtcggccacc tcaaagtttc 31020  
 ccttcagccc atccagggtc ctaatctccg aaaacgagag catctccttg acatagccga 31080  
 cgttgtcctt tgttatttcg gttacatacc gcagttaaag gccctgttt ttgaccgct 31140  
 caacccttt ctcccttatg gcgtcaaccc ctatcatcac ggacggggcc acggagtta 31200  
 tgcaagagtc tatcttcaca ttggccctgt ctatgaacct caaatggcg ttgtttgcgt 31260  
 tttcagggcc atagtaacc tttgtggtg gtgcaccggc gtcaaacacca ccatcattat 31320  
 cgttctcgtt attgttgacg tcacaaaac cgcgtttgtg cgacaaaccg gggtttgct 31380

caatgtatattt attttcacat acattatcat tatttgtgcc aatgtcatgg agattattat 31440  
tatgtatttag agaagaacct tccaaccgtt atcacgatat cctattttgt tcaatatatt 31500  
aatttgagct taaaacttta taaataccgt atatacggta acaggattat tatttctaaaa 31560  
aaacacttaa aggtacttga caaaattctg aacaaaagat ccccatatt tactaaatac 31620  
caagatttct gcaaactgat gtgatgtgat gtatgcatag taccaatata taggcaaacg 31680  
tttttggcat tagaaaggaa tacgaataga taatcaaaga atgaaatggc cgaacacaaa 31740  
ccaacacccat ggctttcaca cactgtcatt attatgtgaa actttatctg gcctctaatac 31800  
tttgtcagga attaaactgt tttttattgc caattctata atgatatgct ataagcagtt 31860  
agattacctt ttgatggttag tggttgttcc agtagtggtt tctccagtaa tatcatgagt 31920  
ttaagacccc ggctgatggg agcgatagaa tgcttaattg catctattga ggaaagtgtt 31980  
gttgaaggta caacgctcaa tactatcaat tgaggacaac agggattgag aattgttttg 32040  
acaatgataa tccattcata aaaaaaattg caagataaag catatgccgc gattgttgac 32100  
cccctatttt gcatgcgttc caacaaaaag ttgtcttaac tttgcagaca tttgaataaa 32160  
ttaaaaagat gttgttgact ttcgtttatt gattgattaa gattacggtt ttattttacc 32220  
aaggatttaa gcattacttg cctacacgaa attaaattgc gagcaggaaa acaggaatgt 32280  
gtttacataa taagaatata cccctaacca agtctttttc ctatcgcat tttttttggt 32340  
tacgccaggg cgaagaatat acttttggtg acaatgattg gtaaaccctt taaccttgct 32400  
tttgcgtgaa ttgtcataat tgatgttcgt aaagataaaa gcaataaaaa gaaatagtca 32460  
ttatgtagaa taacacattt tttttataac ccgttataat ttaattgcaa agcagtcatac 32520  
tttctaaaaat aatcacaatt tgcagaatgc cgtcacttca tcttggtgca tatggtttaa 32580  
ttttggatat tttcgaaagc ccaatcaca ggttaaaccg tagaacaagt cacttgatta 32640  
ttaaaatata tccacatatg gataacaata caaggatgag ttcttttagca atcgagtttt 32700  
ttttatccct tttttcaata acgttacttt ctaaaagaat ataccaacca gtgaaatcaa 32760  
agtcatatac ctaccatgac aagcatccat ttcagtacaa gatggaggat tatgcaaacc 32820  
acaacaaaat tgtagactat aaaaactgct tacttttttt tcaagtatcg atgttacaaa 32880  
aaaataaaat aattaggatt cgggttccag gtttgtttta tacaggtggc tggatttccc 32940  
tcacactaaa gtttttgata tccacatcat ttgcaccatac ccacctgaaa gtagcaatgg 33000  
ggcctcccca ggatataatc tgatccggct caccaccaca ctcttcacca tcatttccaa 33060  
accacactga gtcagtgaat gtgtatacct tttgccaatt gttcttcaga gtcgggctat 33120  
ccgggtttct gtctacccat atttcagtgg tgactacggt ctcaccacca gccaatgggt 33180

ggttatagat catggcttta aatccaatga atctatcaaa actagacgcc gaaggtgagg 33240  
 gtgtggtagt gcttgaaaac acataggaga catgccactg ctcttttgca agcctaaccc 33300  
 ttccatcata gaatagatct gctttatatg ctgagccctc gcatccttcg ccatcatagt 33360  
 gcctaccacc cctgtcatac caagcgaaat tttcagaatc atctccacta ttaaccctta 33420  
 caatacccggt catttccaca ttcttccaat catttggata ctgcatgtat ccttgtgttg 33480  
 cgagtaccga gtgatcgtaa gtctcaatat cctctggatg gtaccctgat gatgtaaaca 33540  
 cgttatatct gacctgatcg tcattaacgt tccaactgcc atctggggtt aggtccatgt 33600  
 caggtggggtt tgttcgtgga tcattgttcg ggttttgcat attcataaac catttttctc 33660  
 caccacccgc cttatcgggg taaatctggg ttatcccaaa ctgggtcta atgtccctccgc 33720  
 ctccagaagg ggcaacagag aacgtccata ccttgtcggc agccaatggg acaccagtgc 33780  
 catccgtagc accggttggt attctggcag tgtatgtggc accaggtgtt aaatctgcag 33840  
 aggggttttag ggtcgcaact gtgttggttg gtgaattcat gcttacgggt gcgggcacag 33900  
 gtgcgcctcc gcttggttagc agtgt 33925

<210> 2

<211> 2367

<212> DNA

<213> Crenarchaeote

<400> 2

atggtgataa aatccgactt gcctctggag gagaaaaata gttattatca aaaagaactt 60  
 ccagaaaata ttccatcatt gttactttct tccgtttaca taggagaaaa aaatcagtg 120  
 tttttgaagt ttacaatcc agaagattct caaatatatt tttggagcga gtcttttatt 180  
 gaaaatcata taaataaaca tcaacottat tgctttgtaa aggaactcta ttctgatcag 240  
 gttaaaacaa tagttagcaa agagccacat aggttttagac tagaaaaaat aaaaaaatg 300  
 gacgatattg aggacaagga aatatcgggt tttaaaataa ttgccctga cccctttcc 360  
 attggtggaa cagatagtag ttttagggaa aaggttactt cttgggaggc tgatatcaaa 420  
 taccatgaaa gttatttatt cgatttgggt ctaattccgg gagcgtttta taacagaata 480  
 ggcaataatt tagtttttca tgaattccca atgccagaga aagttgacga atatctggat 540  
 aatctcataa aacctaattt taaagaaaat gagccaaaaa gtagtgaata taatgagttt 600  
 ctaataaagt ggtcaagatt gttaaaccag cctattccgg atatcaaaag aatttctttg 660

gatatagaag tggactctga agaggggaagg atgcccacag ccagagatca cgataaagta 720  
  
attactgcag tgggtttatc ggcacgcat ggatttagaa aggtattcgt cttaagaaaa 780  
gatccaaatt ttgatccctc taaactagat tcaacaaccg ttgaattatg tgatagcgaa 840  
aaagacatga tactaaaagt ttttgctatt attcaaaatt atccaatagt tttaaccttt 900  
aatgggtgatg attttgattt accttattta tatgctagat ctcaagacc ctcgatagac 960  
cctgtacaca aaaaacccat tagtaaagaa ttggtgccta ttttagttaa aaaagactct 1020  
tttataaaaa ggggtattca ggcggatccg gtttccttaa agcatggaat ccatatcgat 1080  
ttattcagga catttcaaaa taaatctgta cagaattatg cttttagtca taaatactct 1140  
gagtttactt taaatgctat ctgcgaagcc ctattaaacg agtcaaaaat agactttgat 1200  
gaaagcatag gtgatcttcc attggaaaaa ctggccgagt attgcctcaa agatgcagac 1260  
ttgacatttc gtctgacatc tttcaatgac aattttactga taaaattggt gattatcatt 1320  
tctaggatat cccgaatgtc aatagaagat ataacaagat tcggggtgaa tcaatggatt 1380  
aggtccatga tgttttttga acataggcag caaaatatca ttattccccg taaagatgaa 1440  
ttacagaaaa aaggaacatc gtctacagtt gccattataa aggaaaaaaa atatcgagga 1500  
ggctctggtg ttgagcccg tttaggaatt catttcaatg tcatagttgt agattttgct 1560  
agtctgtatc ctagcataat taaagttcac aattttatctt acgaaacagt caattgtcct 1620  
catgaaaatt gcagaaggga tccatcaaca catattgagc aaacaaacca ttgggtttgc 1680  
aaggaaaagc aagggatgac ctccatattg ataggaacc taagggatct aagggttaat 1740  
tattacaaat atctatcaaa ggataattct ttggataaag aggataaaca gctatacagt 1800  
gttatcagtc aggcataaa ggttatttta aatgctacgt atgggggttat ggggtgctgaa 1860  
atatttccgc tctattgttt acctgtagct gaggctaccg cagcggttg aaggatgacc 1920  
acaacaaaaa ctattgaaaa atgcaacgaa gaaaagattg aggttattta cggtgatacg 1980  
gattctctgt tcctaaagaa tccttccaag gaaggattaa gtggaatttc atcctggtct 2040  
aaaaaagaac taggcataga ttggagata gataaaagat atcgctacgt ggtttttagt 2100  
gaactaaaaa aaaattacct aggtgtattg gaggacggaa ctgtagatgt taaaggatta 2160  
acagggaaga agtctcatac acctccaata ataagacaag ctttctatga catattaaat 2220  
gtccttaaag aaatattttc agaaaaagac tttgaaagag caaaggaaaa gataaaaaaa 2280  
atagtgcaat caattgcaga aaacttgag aaaaaagaa tttctctgga agaattaagt 2340  
tttaatgtta tgatcaacaa ggctgtg 2367

&lt;210&gt; 3

&lt;211&gt; 789

&lt;212&gt; PRT

&lt;213&gt; Crenarchaeote

&lt;400&gt; 3

Met Val Ile Lys Ser Asp Leu Pro Leu Glu Glu Lys Asn Ser Tyr Tyr  
 1 5 10 15

Gln Lys Glu Leu Pro Glu Asn Ile Pro Ser Leu Leu Leu Ser Ser Val  
 20 25 30

Tyr Ile Gly Glu Lys Lys Ser Val Phe Leu Lys Phe Tyr Asn Pro Glu  
 35 40 45

Asp Ser Gln Ile Tyr Phe Trp Ser Glu Ser Phe Ile Glu Asn His Ile  
 50 55 60

Asn Lys His Gln Pro Tyr Cys Phe Val Lys Glu Leu Tyr Ser Asp Gln  
 65 70 75 80

Val Lys Thr Ile Val Ser Lys Glu Pro His Arg Phe Arg Leu Glu Lys  
 85 90 95

Ile Lys Lys Met Asp Asp Ile Glu Asp Lys Glu Ile Ser Val Phe Lys  
 100 105 110

Ile Ile Ala Pro Asp Pro Leu Ser Ile Gly Gly Thr Asp Ser Ser Phe  
 115 120 125

Arg Glu Lys Val Thr Ser Trp Glu Ala Asp Ile Lys Tyr His Glu Ser  
 130 135 140

Tyr Leu Phe Asp Leu Gly Leu Ile Pro Gly Ala Phe Tyr Asn Arg Ile  
 145 150 155 160

Gly Asn Asn Leu Val Phe His Glu Phe Pro Met Pro Glu Lys Val Asp  
 165 170 175

Glu Tyr Leu Asp Asn Leu Ile Lys Pro Asn Phe Lys Glu Asn Glu Pro  
 180 185 190

Lys Ser Ser Glu Tyr Asn Glu Phe Leu Ile Lys Trp Ser Arg Leu Leu  
195 200 205

Asn Gln Pro Ile Pro Asp Ile Lys Arg Ile Ser Leu Asp Ile Glu Val  
210 215 220

Asp Ser Glu Glu Gly Arg Met Pro Thr Ala Arg Asp His Asp Lys Val  
225 230 235 240

Ile Thr Ala Val Gly Leu Ser Ala Ser Asp Gly Phe Arg Lys Val Phe  
245 250 255

Val Leu Arg Lys Asp Pro Asn Phe Asp Pro Ser Lys Leu Asp Ser Thr  
260 265 270

Thr Val Glu Leu Cys Asp Ser Glu Lys Asp Met Ile Leu Lys Val Phe  
275 280 285

Ala Ile Ile Gln Asn Tyr Pro Ile Val Leu Thr Phe Asn Gly Asp Asp  
290 295 300

Phe Asp Leu Pro Tyr Leu Tyr Ala Arg Ser Gln Asp Pro Ser Ile Asp  
305 310 315 320

Pro Val His Lys Lys Pro Ile Ser Lys Glu Leu Val Pro Ile Leu Val  
325 330 335

Lys Lys Asp Ser Phe Ile Lys Arg Gly Ile Gln Ala Asp Pro Val Ser  
340 345 350

Leu Lys His Gly Ile His Ile Asp Leu Phe Arg Thr Phe Gln Asn Lys  
355 360 365

Ser Val Gln Asn Tyr Ala Phe Ser His Lys Tyr Ser Glu Phe Thr Leu  
370 375 380

Asn Ala Ile Cys Glu Ala Leu Leu Asn Glu Ser Lys Ile Asp Phe Asp  
385 390 395 400

Glu Ser Ile Gly Asp Leu Pro Leu Glu Lys Leu Ala Glu Tyr Cys Leu  
405 410 415

Lys Asp Ala Asp Leu Thr Phe Arg Leu Thr Ser Phe Asn Asp Asn Leu  
420 425 430

Leu Ile Lys Leu Leu Ile Ile Ile Ser Arg Ile Ser Arg Met Ser Ile  
 435 440 445

Glu Asp Ile Thr Arg Phe Gly Val Asn Gln Trp Ile Arg Ser Met Met  
 450 455 460

Phe Phe Glu His Arg Gln Gln Asn Ile Ile Ile Pro Arg Lys Asp Glu  
 465 470 475 480

Leu Gln Lys Lys Gly Thr Ser Ser Thr Val Ala Ile Ile Lys Glu Lys  
 485 490 495

Lys Tyr Arg Gly Gly Leu Val Val Glu Pro Val Leu Gly Ile His Phe  
 500 505 510

Asn Val Ile Val Val Asp Phe Ala Ser Leu Tyr Pro Ser Ile Ile Lys  
 515 520 525

Val His Asn Leu Ser Tyr Glu Thr Val Asn Cys Pro His Glu Asn Cys  
 530 535 540

Arg Arg Asp Pro Ser Thr His Ile Glu Gln Thr Asn His Trp Val Cys  
 545 550 555 560

Lys Glu Lys Gln Gly Met Thr Ser Ile Leu Ile Gly Thr Leu Arg Asp  
 565 570 575

Leu Arg Val Asn Tyr Tyr Lys Tyr Leu Ser Lys Asp Asn Ser Leu Asp  
 580 585 590

Lys Glu Asp Lys Gln Leu Tyr Ser Val Ile Ser Gln Ala Ile Lys Val  
 595 600 605

Ile Leu Asn Ala Thr Tyr Gly Val Met Gly Ala Glu Ile Phe Pro Leu  
 610 615 620

Tyr Cys Leu Pro Val Ala Glu Ala Thr Ala Ala Val Gly Arg Met Thr  
 625 630 635 640

Thr Thr Lys Thr Ile Glu Lys Cys Asn Glu Glu Lys Ile Glu Val Ile  
 645 650 655

Tyr Gly Asp Thr Asp Ser Leu Phe Leu Lys Asn Pro Ser Lys Glu Gly  
 660 665 670



Leu Ser Gly Ile Ser Ser Trp Ser Lys Lys Glu Leu Gly Ile Asp Leu  
675 680 685

Glu Ile Asp Lys Arg Tyr Arg Tyr Val Val Phe Ser Glu Leu Lys Lys  
690 695 700

Asn Tyr Leu Gly Val Leu Glu Asp Gly Thr Val Asp Val Lys Gly Leu  
705 710 715 720

Thr Gly Lys Lys Ser His Thr Pro Pro Ile Ile Arg Gln Ala Phe Tyr  
725 730 735

Asp Ile Leu Asn Val Leu Lys Glu Ile Phe Ser Glu Lys Asp Phe Glu  
740 745 750

Arg Ala Lys Glu Lys Ile Lys Lys Ile Val Gln Ser Ile Ala Glu Asn  
755 760 765

Leu Glu Lys Lys Arg Ile Ser Leu Glu Glu Leu Ser Phe Asn Val Met  
770 775 780

Ile Asn Lys Ala Val  
785

<210> 4

<211> 882

<212> DNA

<213> Crenarchaeote

<400> 4

atggatattg atcataaaat ttagtatat ttcattat ctattaacaa aataattatt 60

acaatgggtt tggtttcgga tagacaaaga aacgagacaa tggattttat aaaaatactg 120

ggatataaca tcagatatat aaaaatagat caagtcaagt caaatgaaac cataattctg 180

cttcatggta taggagcttc cgcagaacga tggtcagaat tagtccatt tttgtataat 240

tgcaatataa ttataccaga catcattggt tttggttaca gtgaaaaacc aaggatagag 300

tacaacatag atttatttgt aaagtttttg gatgaattgt ttctgaaact tgaaatcaaa 360

aaccccataa taatgggttc gtcttttggt ggtcaattga ttttagaata ttatttcagg 420

cacaaagact tttttaaaaa atgattcta gtgtccccgg ccggtacca agagagaccg 480

acactagcgt taaggcaata cacttactca tgtttatacc caacaagaga aaataccgaa 540  
 agagcattta agatgatgtc gcatttcaat cacacagtaa aagattcaat gataaaggat 600  
 tttattaata gaatgaagca gcccaacgca aaacactcgt ttgtttcaac acttttagca 660  
 ctaaggaaaa atagtgattt acaagacaac ctgagggaaa tcaaaatccc aacttttagta 720  
 atatgggggaa aagaggacaa caccattcca gtagaaaata tagagtattt caggggcatc 780  
 ccttttgtaa aaacatgcat aatgagtgat tgcgggtcatg tgccttttgt tgaaaagcct 840  
 cttgagtttt ataaaatagt caaagagttt atcgactcct aa 882

<210> 5

<211> 293

<212> PRT

<213> Crenarchaeote

<400> 5

Met Asp Ile Asp His Lys Ile Leu Val Tyr Phe Ile Leu Ser Ile Asn  
1 5 10 15

Lys Ile Ile Ile Thr Met Gly Leu Val Ser Asp Arg Gln Arg Asn Glu  
20 25 30

Thr Met Asp Phe Ile Lys Ile Leu Gly Tyr Asn Ile Arg Tyr Ile Lys  
35 40 45

Ile Asp Gln Val Lys Ser Asn Glu Thr Ile Ile Leu Leu His Gly Ile  
50 55 60

Gly Ala Ser Ala Glu Arg Trp Ser Glu Leu Val Pro Phe Leu Tyr Asn  
65 70 75 80

Cys Asn Ile Ile Ile Pro Asp Ile Ile Gly Phe Gly Tyr Ser Glu Lys  
85 90 95

Pro Arg Ile Glu Tyr Asn Ile Asp Leu Phe Val Lys Phe Leu Asp Glu  
100 105 110

Leu Phe Leu Lys Leu Glu Ile Lys Asn Pro Ile Ile Met Gly Ser Ser  
115 120 125

Phe Gly Gly Gln Leu Ile Leu Glu Tyr Tyr Phe Arg His Lys Asp Phe  
130 135 140

Phe Lys Lys Met Ile Leu Val Ser Pro Ala Gly Thr Gln Glu Arg Pro  
145 150 155 160

Thr Leu Ala Leu Arg Gln Tyr Thr Tyr Ser Cys Leu Tyr Pro Thr Arg  
165 170 175

Glu Asn Thr Glu Arg Ala Phe Lys Met Met Ser His Phe Asn His Thr  
180 185 190

Val Lys Asp Ser Met Ile Lys Asp Phe Ile Asn Arg Met Lys Gln Pro  
195 200 205

Asn Ala Lys His Ser Phe Val Ser Thr Leu Leu Ala Leu Arg Lys Asn  
210 215 220

Ser Asp Leu Gln Asp Asn Leu Arg Glu Ile Lys Ile Pro Thr Leu Val  
225 230 235 240

Ile Trp Gly Lys Glu Asp Asn Thr Ile Pro Val Glu Asn Ile Glu Tyr  
245 250 255

Phe Arg Gly Ile Pro Phe Val Lys Thr Cys Ile Met Ser Asp Cys Gly  
260 265 270

His Val Pro Phe Val Glu Lys Pro Leu Glu Phe Tyr Lys Ile Val Lys  
275 280 285

Glu Phe Ile Asp Ser  
290

<210> 6

<211> 318

<212> DNA

<213> Crenarchaeote

<400> 6

ttgaatcaat ccacttctat gagtaatgag aatgaagaaa ataaagatat agatttttaag 60

aatccattg aaaaggctgc ggaattccag caggatttgt tgcgacagtt ctctacaatt 120

caatacaatg cgtttcagaa tatgttttca tctttgcaag gatttacaaa ttataatgcc 180

atgttttaaaa ccaccgtaca gacgggtggc aggatctcaa ttcccgaagc agaaagaaat 240  
 gctttgggga ttgaagaggg tgatctagtc caggttataa ttataccggt gacaaggaaa 300  
 aagaaaaaca caagttaa 318

<210> 7

<211> 105

<212> PRT

<213> Crenarchaeote

<400> 7

Met Asn Gln Ser Thr Ser Met Ser Asn Glu Asn Glu Glu Asn Lys Asp  
 1 5 10 15

Ile Asp Phe Lys Lys Ser Ile Glu Lys Ala Ala Glu Phe Gln Gln Asp  
 20 25 30

Leu Leu Arg Gln Phe Ser Thr Ile Gln Tyr Asn Ala Phe Gln Asn Met  
 35 40 45

Phe Ser Ser Leu Gln Gly Phe Thr Asn Tyr Asn Ala Met Phe Lys Thr  
 50 55 60

Thr Val Gln Thr Gly Gly Arg Ile Ser Ile Pro Glu Ala Glu Arg Asn  
 65 70 75 80

Ala Leu Gly Ile Glu Glu Gly Asp Leu Val Gln Val Ile Ile Ile Pro  
 85 90 95

Leu Thr Arg Lys Lys Lys Asn Thr Ser  
 100 105

<210> 8

<211> 1086

<212> DNA

<213> Crenarchaeote

<400> 8

atgagaaaaa aaatgaataa ttccttaatt aattatttag tgaatgatta ttttacgttt 60

gtaagggatc ctgataacat ttcaaaatta aaagaaatca ggaaaaaatt gtcgaatata 120  
 gaaaacataa agactggatc aagcgaatat gaggtaataa gggaaacaac cctcttccgt 180  
 ttactacatt ataaaccctt aaagcaacaa actttcaagt accctttgtt gattgtttat 240  
 gcattaataa acaaatcata tattttggat ctgcagaacg acaaaagttg gataaggaac 300  
 ctgctagagc agggcataaa tgtctatctg attgactgga aacccccgtc aaaactggat 360  
 aaatacatca ctgttgatga ttatgtcaat ttgtttattt atgagtgtgt agaatacata 420  
 aaaaacatag aaaacattga tcagatttca ttacaaggat attgcatggg ggttacaatg 480  
 tccttgatgt acacttcgct atatcaaaaa aacattaaaa atctagtcac cattgctcca 540  
 attgttgatg ccgagaaaga caaatccgta ataaaaaaca tggctgagca catggatatt 600  
 gacaaagtac tgtcctatca cgaaaacttt ccatatgaat tactgtatct ggtttatgca 660  
 tcactaaaac cattcaagca aggtgtaaac aaatactata atttatttaa aaactttgaa 720  
 gatgaaagtt ttgtacagaa ctttttaaga atagagaaat ggctgtatga cacacctct 780  
 attgcggggg aaacctttag gcaatgggta aaggatatct atcagcaaaa cttttttgca 840  
 aaaaacaaga tgattgtggg tgaaaacaag ataaatttgt caaacattaa ggttcccgtt 900  
 cttaatgttg tagctgaatt tgaccacctt gtaacgtctg acagcagtag ctccctaaac 960  
 aacctaatth caagtcagga taaaagcctg atgaaatttc caacagggca tgtagggcta 1020  
 attgctagca acttttcaca gaaaaatgtt ttaccaaaaa ttggaaaatg gattcaaaca 1080  
 catta 1086

&lt;210&gt; 9

&lt;211&gt; 361

&lt;212&gt; PRT

&lt;213&gt; Crenarchaeote

&lt;400&gt; 9

Met Arg Lys Lys Met Asn Asn Ser Leu Ile Asn Tyr Leu Val Asn Asp  
 1 5 10 15

Tyr Phe Thr Phe Val Arg Asp Pro Asp Asn Ile Ser Lys Leu Lys Glu  
 20 25 30

Ile Arg Lys Lys Leu Ser Asn Ile Glu Asn Ile Lys Thr Gly Ser Ser  
 35 40 45

Glu Tyr Glu Val Ile Arg Glu Thr Thr Leu Phe Arg Leu Leu His Tyr  
50 55 60

Lys Pro Leu Lys Gln Gln Thr Phe Lys Tyr Pro Leu Leu Ile Val Tyr  
65 70 75 80

Ala Leu Ile Asn Lys Ser Tyr Ile Leu Asp Leu Gln Asn Asp Lys Ser  
85 90 95

Trp Ile Arg Asn Leu Leu Glu Gln Gly Ile Asn Val Tyr Leu Ile Asp  
100 105 110

Trp Lys Pro Pro Ser Lys Leu Asp Lys Tyr Ile Thr Val Asp Asp Tyr  
115 120 125

Val Asn Leu Phe Ile Tyr Glu Cys Val Glu Tyr Ile Lys Asn Ile Glu  
130 135 140

Asn Ile Asp Gln Ile Ser Leu Gln Gly Tyr Cys Met Gly Gly Thr Met  
145 150 155 160

Ser Leu Met Tyr Thr Ser Leu Tyr Gln Lys Asn Ile Lys Asn Leu Val  
165 170 175

Thr Ile Ala Pro Ile Val Asp Ala Glu Lys Asp Lys Ser Val Ile Lys  
180 185 190

Asn Met Ala Glu His Met Asp Ile Asp Lys Val Leu Ser Tyr His Glu  
195 200 205

Asn Phe Pro Tyr Glu Leu Leu Tyr Leu Val Tyr Ala Ser Leu Lys Pro  
210 215 220

Phe Lys Gln Gly Val Asn Lys Tyr Tyr Asn Leu Phe Lys Asn Phe Glu  
225 230 235 240

Asp Glu Ser Phe Val Gln Asn Phe Leu Arg Ile Glu Lys Trp Leu Tyr  
245 250 255

Asp Thr Pro Pro Ile Ala Gly Glu Thr Phe Arg Gln Trp Val Lys Asp  
260 265 270

Ile Tyr Gln Gln Asn Leu Phe Ala Lys Asn Lys Met Ile Val Gly Glu  
275 280 285

Asn Lys Ile Asn Leu Ser Asn Ile Lys Val Pro Val Leu Asn Val Val  
 290 295 300

Ala Glu Phe Asp His Leu Val Thr Ser Asp Ser Ser Ser Ser Leu Asn  
 305 310 315 320

Asn Leu Ile Ser Ser Gln Asp Lys Ser Leu Met Lys Phe Pro Thr Gly  
 325 330 335

His Val Gly Leu Ile Ala Ser Asn Phe Ser Gln Lys Asn Val Leu Pro  
 340 345 350

Lys Ile Gly Lys Trp Ile Gln Thr His  
 355 360

<210> 10

<211> 582

<212> DNA

<213> Crenarchaeote

<400> 10

```

ttgcaattag aaaataacaa tattggagag gaaaaaaaca gtaaaaacac tctatctgaa      60
gaggcaggac ttcagtctgt atttgaaaac ttataaaaac aattaacaga gttaaatagc      120
cttacaacct tggggccatt cacctcttta atgaatgac caaaccttaa tttaaataca      180
ttaaaggaac acggtaatTT gttactgaga tatcagtcac ttctcaacct atacttttcc      240
cgtatgataa atgcttattt gttggccgta aacaagggtat cgtctgctat agatgaaaaa      300
aaccgccgac atattaggaa aataatcata aatacttttg aggatgtgtt ctcgatcaatg      360
ttgcagtcaa cagacttttc aatcaattat aacaatttat tgaattccag cattgatgtc      420
atcaaaaagtt atcaaaaaat ttacgattca aatgccgttt tgtttaggtc acaacaacaa      480
ctgtcaaaag aagaaaaaga cctgttattt tataatctct atgaaatcaa aaaaatatca      540
ttggaaatca aaaaaaaatt aaatgagaaa aaaaatgaat aa                        582

```

<210> 11

<211> 193

<212> PRT

&lt;213&gt; Crenarchaeote

&lt;400&gt; 11

Met Gln Leu Glu Asn Asn Asn Ile Gly Glu Glu Lys Asn Ser Lys Asn  
 1 5 10 15

Thr Leu Ser Glu Glu Ala Gly Leu Gln Ser Val Phe Glu Asn Phe Ile  
 20 25 30

Lys Gln Leu Thr Glu Leu Asn Ser Leu Thr Thr Leu Gly Pro Phe Thr  
 35 40 45

Ser Leu Met Asn Asp Pro Asn Leu Asn Leu Asn Thr Leu Lys Glu His  
 50 55 60

Gly Asn Leu Leu Leu Arg Tyr Gln Ser Phe Leu Asn Leu Tyr Phe Ser  
 65 70 75 80

Arg Met Ile Asn Ala Tyr Leu Leu Ala Val Asn Lys Val Ser Ser Ala  
 85 90 95

Ile Asp Glu Lys Asn Pro Asp Asp Ile Arg Lys Ile Ile Ile Asn Thr  
 100 105 110

Phe Glu Asp Val Phe Ser Ser Met Leu Gln Ser Thr Asp Phe Ser Ile  
 115 120 125

Asn Tyr Asn Asn Leu Leu Asn Ser Ser Ile Asp Val Ile Lys Ser Tyr  
 130 135 140

Gln Lys Ile Tyr Asp Ser Asn Ala Val Leu Phe Arg Ser Gln Gln Gln  
 145 150 155 160

Leu Ser Lys Glu Glu Lys Asp Leu Leu Phe Tyr Asn Leu Tyr Glu Ile  
 165 170 175

Lys Lys Ile Ser Leu Glu Ile Lys Lys Lys Leu Asn Glu Lys Lys Asn  
 180 185 190

Glu



&lt;210&gt; 12

&lt;211&gt; 438

&lt;212&gt; DNA

&lt;213&gt; Crenarchaeote

&lt;400&gt; 12

```

atgcctacaa gttcagatgt tttatacatg tccaaaccag cggtgggatg tatacattct      60
tttgacatgg tgggcgggta tgcgcatacc caaaaactaa gatgctgtat cagcctcggg      120
aagagggtta tgtgggggac aatagaaaga atccatccac aaacgaatgg ttttggcaaa      180
tgtctgcctt ggctcattgt ttctatatat ggtttcgcca tagataatat ttgggtaatt      240
actcatgtgc ctgtatacaa aaatagacaa ccatctctac ctatatataa attttttgac      300
aagggtcagg ttctttttct ctttttttg caaattatgc cgggccaccc agaaacaaac      360
cccgcccttg ggcccgcaat gattactggg caaccocaaat ctacgccccc acgccagga      420
gtgcaagtga caatgtga                                     438

```

&lt;210&gt; 13

&lt;211&gt; 145

&lt;212&gt; PRT

&lt;213&gt; Crenarchaeote

&lt;400&gt; 13

```

Met Pro Thr Ser Ser Asp Val Leu Tyr Met Ser Lys Pro Ala Val Val
1           5           10          15

Cys Ile His Ser Phe Asp Met Val Gly Gly Tyr Ala His Thr Gln Lys
          20          25          30

Leu Arg Cys Cys Ile Ser Leu Gly Lys Arg Val Met Trp Gly Thr Ile
          35          40          45

Glu Arg Ile His Pro Gln Thr Asn Gly Phe Gly Lys Cys Leu Pro Trp
          50          55          60

Leu Ile Val Ser Ile Tyr Gly Phe Ala Ile Asp Asn Ile Trp Val Ile
65          70          75          80

```

Thr His Val Pro Val Tyr Lys Asn Arg Gln Pro Ser Leu Pro Ile Tyr  
                     85                    90                    95

Lys Phe Phe Asp Lys Gly Gln Val Leu Phe Leu Leu Phe Leu Gln Ile  
                     100                    105                    110

Met Pro Gly His Pro Glu Thr Asn Pro Ala Phe Gly Pro Ala Met Ile  
                     115                    120                    125

Thr Gly Gln Pro Lys Ser Ser Ala Pro Arg Pro Gly Val Gln Val Thr  
                     130                    135                    140

Met  
 145

<210> 14

<211> 915

<212> DNA

<213> Crenarchaeote

<400> 14

ttggattcctt ggggcgaatc taatattgtc ctttggtgc tacttaggct attcaagcca	60
aaaaccaaga tctttgttgt gtttcatcac catgaaccgc ggatatctat ttgcaagaac	120
tattttgaat ttctgtacaa ttatctaata caaaaggcta ctgcggtgat gcttaaggat	180
tctgatatga ttttgaccgt gagtcaagcg tcaaagcatg aactcaacac agtctatgga	240
ataggggtta gcaaaatcaa taatttgaag gaaacagcaa ataaaaaac cagggaatta	300
gcaaaaaatc tgaccaacag aattgccatt gtaggaactg gaatagataa aaatatcttt	360
ttaaaggatt ccaacagagg agtaatcaac aataaaaagg acattgattt tctttgtatc	420
ggaaggatag aaaaatttca tggactggag gaaatttggg ctgcaataaa aacactcaga	480
ccagaatcta attttgtaat ggttgggogc atacccttg ataaggctgc aaaactacgt	540
aatgcgggta tagatcacag aggtttgtc tccgaggaag aaaagattag cttttattct	600
aaatctaaag tctttatttt tccatcatcc agagagggtt ttggcattgc tgtggctgag	660
gccttagttt cgtgtgttcc cactgttgcc tggaaactcc ccgtttttga agaactatac	720
ttaaaaaatg gtaatacaaa cataaaacta atagaatatg gagaaaccac cctgtttgca	780
gaagagtgcg taaaaatgct aaataaatat ggcataatca aaaaggcgac tgaaggaaaa	840
aaggtcagtt tccaactccc aaactggcag acagtggcaa aaaatgtaat gacaacaata	900

gaatctgtaa cctaa

915

&lt;210&gt; 15

&lt;211&gt; 304

&lt;212&gt; PRT

&lt;213&gt; Crenarchaeote

&lt;400&gt; 15

Met Asp Ser Trp Gly Glu Ser Asn Ile Val Leu Trp Leu Leu Leu Arg  
 1 5 10 15

Leu Phe Lys Pro Lys Thr Lys Ile Phe Val Val Phe His His His Glu  
 20 25 30

Pro Arg Ile Ser Ile Cys Lys Asn Tyr Phe Glu Phe Leu Tyr Asn Tyr  
 35 40 45

Leu Ile Gln Lys Ala Thr Ala Val Met Leu Lys Asp Ser Asp Met Ile  
 50 55 60

Leu Thr Val Ser Gln Ala Ser Lys His Glu Leu Asn Thr Val Tyr Gly  
 65 70 75 80

Ile Gly Val Ser Lys Ile Asn Asn Leu Lys Glu Thr Ala Asn Lys Lys  
 85 90 95

Thr Arg Glu Leu Ala Lys Asn Leu Thr Asn Arg Ile Ala Ile Val Gly  
 100 105 110

Thr Gly Ile Asp Lys Asn Ile Phe Leu Lys Asp Ser Asn Arg Gly Val  
 115 120 125

Ile Asn Asn Lys Lys Asp Ile Asp Phe Leu Cys Ile Gly Arg Ile Glu  
 130 135 140

Lys Phe His Gly Leu Glu Glu Ile Trp Thr Ala Ile Lys Thr Leu Arg  
 145 150 155 160

Pro Glu Ser Asn Phe Val Met Val Gly Arg Ile Pro Pro Asp Lys Ala  
 165 170 175

Ala Lys Leu Arg Asn Ala Gly Ile Asp His Arg Gly Phe Val Ser Glu  
 180 185 190

Glu Glu Lys Ile Ser Leu Tyr Ser Lys Ser Lys Val Phe Ile Phe Pro  
 195 200 205

Ser Ser Arg Glu Gly Phe Gly Ile Ala Val Ala Glu Ala Leu Val Ser  
 210 215 220

Cys Val Pro Thr Val Ala Trp Lys Leu Pro Val Phe Glu Glu Leu Tyr  
 225 230 235 240

Leu Lys Asn Gly Asn Thr Asn Ile Lys Leu Ile Glu Tyr Gly Glu Thr  
 245 250 255

Thr Leu Phe Ala Glu Glu Cys Val Lys Met Leu Asn Lys Tyr Gly Ile  
 260 265 270

Ile Lys Lys Ala Thr Glu Gly Lys Lys Val Ser Phe Gln Leu Pro Asn  
 275 280 285

Trp Gln Thr Val Ala Lys Asn Val Met Thr Thr Ile Glu Ser Val Thr  
 290 295 300

<210> 16

<211> 1692

<212> DNA

<213> Crenarchaeote

<400> 16

atgtgtggaa ttgttggaat ttttaagtaaa aaagagagaa atgttgcccc cttgatagga 60  
 aaaatgctat cctgtatgaa aaaccgggggt ccggatggca tgggtttgtc tacagagaat 120  
 caaatagttt attctgatac ctttgataat ccattgtttt cacaggtaga ggggcatgac 180  
 gtttttaggtc acagtcgttt ggcaatagtt ggtggctcct gtggtcagca gccgtttgtg 240  
 agttgtgata aaaaactcat tctggagcat aatggtgaaa tatataacta taaagaaatc 300  
 agaaagaacc tttctgcaca tcacactttt actacctcga ctgatagtga agttattgtt 360  
 caccttcttg aagaccatta tcaaaacact aaaggcgatc taatcgaagc tataaggaga 420  
 accgttacct agcttgatgg aatttatgtt ttggcgatta gagagcagtc cacaggagat 480

```

attgtgctgg tacgggatgg cattggagta agacaaatth actatggtga aagtagtgat      540
ttcattgcat ttgcatcaga aagaaaagcc ttatggaaaa ttgctatgtc cgaccaaate      600
aaaagactth tgccaggcta tgctcttgte atttcgcgga aggaagggtc ctccaatttc      660
aagactacat tgthttccgat ttctgtaaat acaaaaaaat caatatgtga gaaatattca      720
atcctgtaca cagacatcga ttctgcggtt aacgcatatg gtgatacatt ggttgaatct      780
atgagaaaaac gtgtgagtga ctttaaaaaa atcgggtattg ttttctccgg tgggattgac      840
agtgtaatth tagcgtatth ggcaaaacaa atggcccccg aagttatthg ctatacgtct      900
gggattaaag gttcaagtga tatcctcaac tcaattgaga tagcagaaaa acttgacctc      960
aagttggaaa tagaacagat gactgaaagt gatgttgaaa gtaccattcc aaaaataate     1020
agcataatth aagatgacaa catgggacag gttgaggtth ccattccaat atatggcgcg     1080
gttaaattth ctcacgaaca ggaatacgg gtaatgctta caggtcaggg ggcagacgaa     1140
ctgtttggcg gatattcctg gtattccaaa attgttaaaa aacacggata cgaaaaaatt     1200
cagggatacc tgatagagga cattaagtta ctttācaaaag aaacactgga aagagaggac     1260
aaaataacca tgtctcaaag catagagtta cgcgaaccct ttttagatac taatctgata     1320
gacacggtac tgagaataga tccgcgactc aatattcaaa acaatggcaa taactatgac     1380
aacctaggaa aaagggttca ccgcaaatth gcagaaaaac tagggattcc aaaagagata     1440
gcgtatagaa taaaggaagc agctcagcat ggthctggga tacacaacac cctcaatact     1500
ttggccatga aaaatggtht tacggaatcc aaggthaat ctagtthtct ggacaaatth     1560

aaaaaaaggg agcttatcgg cagctcacia agatatgggc atctthttga aaaggaacia     1620
atctggagtht tggagccgca tatacagatg taththgaga ataththcaa aaacataatth     1680
ccaaggaact ga                                             1692

```

&lt;210&gt; 17

&lt;211&gt; 563

&lt;212&gt; PRT

&lt;213&gt; Crenarchaeote

&lt;400&gt; 17

```

Met Cys Gly Ile Val Gly Ile Leu Ser Lys Lys Glu Arg Asn Val Ala
1           5           10          15

```

Pro Leu Ile Gly Lys Met Leu Ser Cys Met Lys Asn Arg Gly Pro Asp  
 20 25 30

Gly Met Gly Leu Ser Thr Glu Asn Gln Ile Val Tyr Ser Asp Thr Phe  
 35 40 45

Asp Asn Pro Leu Phe Ser Gln Val Glu Gly His Asp Val Leu Gly His  
 50 55 60

Ser Arg Leu Ala Ile Val Gly Gly Ser Cys Gly Gln Gln Pro Phe Val  
 65 70 75 80

Ser Cys Asp Lys Lys Leu Ile Leu Glu His Asn Gly Glu Ile Tyr Asn  
 85 90 95

Tyr Lys Glu Ile Arg Lys Asn Leu Ser Ala His His Thr Phe Thr Thr  
 100 105 110

Ser Thr Asp Ser Glu Val Ile Val His Leu Leu Glu Asp His Tyr Gln  
 115 120 125

Asn Thr Lys Gly Asp Leu Ile Glu Ala Ile Arg Arg Thr Val Thr Gln  
 130 135 140

Leu Asp Gly Ile Tyr Val Leu Ala Ile Arg Glu Gln Ser Thr Gly Asp  
 145 150 155 160

Ile Val Leu Val Arg Asp Gly Ile Gly Val Arg Gln Ile Tyr Tyr Gly  
 165 170 175

Glu Ser Ser Asp Phe Ile Ala Phe Ala Ser Glu Arg Lys Ala Leu Trp  
 180 185 190

Lys Ile Ala Met Ser Asp Gln Ile Lys Arg Leu Leu Pro Gly Tyr Ala  
 195 200 205

Leu Val Ile Ser Arg Lys Glu Gly Ser Ser Asn Phe Lys Thr Thr Leu  
 210 215 220

Phe Pro Ile Ser Val Asn Thr Lys Lys Ser Ile Cys Glu Lys Tyr Ser  
 225 230 235 240

Ile Leu Tyr Thr Asp Ile Asp Ser Ala Val Asn Ala Tyr Gly Asp Thr  
 245 250 255

Leu Val Glu Ser Met Arg Lys Arg Val Ser Asp Phe Lys Lys Ile Gly  
 260 265 270

Ile Val Phe Ser Gly Gly Ile Asp Ser Val Ile Val Ala Tyr Leu Ala  
 275 280 285

Lys Gln Met Ala Pro Glu Val Ile Cys Tyr Thr Ser Gly Ile Lys Gly  
 290 295 300

Ser Ser Asp Ile Leu Asn Ser Leu Glu Ile Ala Glu Lys Leu Asp Leu  
 305 310 315 320

Lys Leu Glu Ile Glu Gln Met Thr Glu Ser Asp Val Glu Ser Thr Ile  
 325 330 335

Pro Lys Ile Ile Ser Ile Ile Glu Asp Asp Asn Met Gly Gln Val Glu  
 340 345 350

Val Ala Ile Pro Ile Tyr Gly Ala Val Lys Leu Ala His Glu Gln Gly  
 355 360 365

Ile Arg Val Met Leu Thr Gly Gln Gly Ala Asp Glu Leu Phe Gly Gly  
 370 375 380

Tyr Ser Trp Tyr Ser Lys Ile Val Lys Lys His Gly Tyr Glu Lys Ile  
 385 390 395 400

Gln Gly Tyr Leu Ile Glu Asp Ile Lys Leu Leu Tyr Lys Glu Thr Leu  
 405 410 415

Glu Arg Glu Asp Lys Ile Thr Met Ser Gln Ser Ile Glu Leu Arg Glu  
 420 425 430

Pro Phe Leu Asp Thr Asn Leu Ile Asp Thr Val Leu Arg Ile Asp Pro  
 435 440 445

Arg Leu Asn Ile Gln Asn Asn Gly Asn Asn Tyr Asp Asn Leu Gly Lys  
 450 455 460

Arg Val His Arg Lys Leu Ala Glu Lys Leu Gly Ile Pro Lys Glu Ile  
 465 470 475 480

Ala Tyr Arg Ile Lys Glu Ala Ala Gln His Gly Ser Gly Ile His Asn  
 485 490 495

Thr Leu Asn Thr Leu Ala Met Lys Asn Gly Phe Thr Glu Ser Lys Val  
 500 505 510

Asn Ser Ser Tyr Leu Asp Lys Leu Lys Lys Arg Glu Leu Ile Gly Ser  
 515 520 525

Ser Gln Arg Tyr Gly His Leu Phe Glu Lys Glu Gln Ile Trp Ser Leu  
 530 535 540

Glu Pro His Ile Gln Met Tyr Leu Glu Asn Ile Ser Lys Asn Ile Leu  
 545 550 555 560

Pro Arg Asn

<210> 18

<211> 666

<212> DNA

<213> Crenarchaeote

<400> 18

```

ttgttgtatc ctatggaatt taaatctaca ttggccggtt ttgatatgga tgggacgcta      60
attgatggaa ggctaattga ggtattgtca aaaaagtgtt gcttgatgc tcaggtcaga      120
cacatccagt ccgacaaatc cattccaggc tatgttaaga cacagaagat agccgctgtg      180
attaggggaa tagaagaaag ggaaatagaa attgctttgg actccatccc ccctgcaaag      240
aacagccagg aggtgatatc tttgctgaag aaaaaagggt tcagaatagg gataattaca      300
gatagttaca gtgttgctgc tcaggccttg gtgaacaaac ttgatttgga ctttttttat      360
gcaaatgaat tgaaggtaga caatgggata gtcaccggag aaataaatat gccgttagga      420
tgggaaaaaa tagactgttt ttgcaagaat tctgtgtgta agagatatca catggaaatc      480
catgcaaaga aaatctgtgc agacataaaa aatacaattg ctattggcga tactaaaggt      540
gacctgtgca tgataaagca ggcaggaata ggtatcgcat atatgcctaa ggataaatat      600
ataaatgaaa caataaataa ggtaaacaca ccggatatga ttggtgtcct tgattttata      660
gagtag

```

<210> 19

<211> 221



&lt;212&gt; PRT

&lt;213&gt; Crenarchaeote

&lt;400&gt; 19

Met Leu Tyr Pro Met Glu Phe Lys Ser Thr Leu Ala Val Phe Asp Met  
 1 5 10 15

Asp Gly Thr Leu Ile Asp Gly Arg Leu Ile Glu Val Leu Ser Lys Lys  
 20 25 30

Phe Gly Leu Tyr Ala Gln Val Arg His Ile Gln Ser Asp Lys Ser Ile  
 35 40 45

Pro Gly Tyr Val Lys Thr Gln Lys Ile Ala Ala Val Ile Arg Gly Ile  
 50 55 60

Glu Glu Arg Glu Ile Glu Ile Ala Leu Asp Ser Ile Pro Pro Ala Lys  
 65 70 75 80

Asn Ser Gln Glu Val Ile Ser Leu Leu Lys Lys Lys Gly Phe Arg Ile  
 85 90 95

Gly Ile Ile Thr Asp Ser Tyr Ser Val Ala Ala Gln Ala Leu Val Asn  
 100 105 110

Lys Leu Asp Leu Asp Phe Phe Tyr Ala Asn Glu Leu Lys Val Asp Asn  
 115 120 125

Gly Ile Val Thr Gly Glu Ile Asn Met Pro Leu Gly Trp Glu Lys Ile  
 130 135 140

Asp Cys Phe Cys Lys Asn Ser Val Cys Lys Arg Tyr His Met Glu Ile  
 145 150 155 160

His Ala Lys Lys Ile Cys Ala Asp Ile Lys Asn Thr Ile Ala Ile Gly  
 165 170 175

Asp Thr Lys Gly Asp Leu Cys Met Ile Lys Gln Ala Gly Ile Gly Ile  
 180 185 190

Ala Tyr Met Pro Lys Asp Lys Tyr Ile Asn Glu Thr Ile Asn Lys Val  
 195 200 205

Asn Thr Pro Asp Met Ile Gly Val Leu Asp Phe Ile Glu  
 210 215 220

<210> 20

<211> 1212

<212> DNA

<213> Crenarchaeote

<400> 20

```

atgagattag attatccacc taactatacc gagaggatag gagcagttag tatccatgcg      60
cttcaaaaga tttatgagat cgattccgga aagatgccca agtttaatgg cctgcatcag      120
catcagtcta taaaggcctt tggttatgac gaactgtcaa gcatattcca agaacttgcc      180
atagtcattc cagtaaagaa cgaaaaaatc agccttcttg aaggagtatt gagcgggtatt      240
ccaaatgaat gtctcatcat catagtttcc aatagccaaa ggactcctgt cgacagattt      300
gccatggagg ttgaaatggg aaggcagtac tctagttttg cagacaagaa aataatgatt      360
attcaccaaa atgatcctga gctggctaata acttttaaga aaataaagta tagatccatc      420
ctcaacacca aaagtcaggt tcgtagtgga aaggctgaag gaatgataat tggaatattg      480
ctggcaaaaa tgcacctaaa agagtacatt ggattttattg acagtgataa ttattttcca      540
ggagcagtaa atgaatatgt caagatcttt gcagcgggat ttggaatggc aaccacccca      600
tacagcaata tcagaatata gtggcggttc aaacccaaaa tcgtaaacaa ctactacaa      660
ttccaagat ggggtagaat ttcagaatcc agtaacaaat acctgaacgc tctaatatcc      720
cacatcacag ggtttgaaag ggagattatc acgactggaa atgcaggtga gcatgcatta      780
tccatgtccc ttgcagaaaa tctcaactat tcaagcggat attcggttga gccctatgag      840
tttatcaaca ttttagaaaa gtttggagggt ctactcccat caaacaatcc tgacatcata      900
gaaaagggta tcgaaatatt tcaaataagag accaggaatc cacactttca tgaggaaaaa      960
ggaaatgatc atttggcagg catgatgcaa gaatctcttc tcgcaataaa caacagcaaa     1020
atttgaaca cagaactgac cagggaataa aatgaccatt tactcatgct tcaggtaaaa     1080
cacaataatg atatgaccaa actcaacttt aagaaaaaac accttataat ggatcccata     1140
aaaataatac ccatcgacaa attcgccgaa tttgtagtta agaattctaa aaccttcatt     1200
agaattggat aa                                           1212

```

<210> 21

&lt;211&gt; 403

&lt;212&gt; PRT

&lt;213&gt; Crenarchaeote

&lt;400&gt; 21

Met Arg Leu Asp Tyr Pro Pro Asn Tyr Thr Glu Arg Ile Gly Ala Val  
1 5 10 15

Ser Ile His Ala Leu Gln Lys Ile Tyr Glu Ile Asp Ser Gly Lys Met  
20 25 30

Pro Lys Phe Asn Gly Leu His Gln His Gln Ser Ile Lys Ala Phe Gly  
35 40 45

Tyr Asp Glu Leu Ser Ser Ile Phe Gln Glu Leu Ala Ile Val Ile Pro  
50 55 60

Val Lys Asn Glu Lys Ile Ser Leu Leu Glu Gly Val Leu Ser Gly Ile  
65 70 75 80

Pro Asn Glu Cys Leu Ile Ile Ile Val Ser Asn Ser Gln Arg Thr Pro  
85 90 95

Val Asp Arg Phe Ala Met Glu Val Glu Met Val Arg Gln Tyr Ser Ser  
100 105 110

Phe Ala Asp Lys Lys Ile Met Ile Ile His Gln Asn Asp Pro Glu Leu  
115 120 125

Ala Asn Thr Phe Lys Lys Ile Lys Tyr Arg Ser Ile Leu Asn Thr Lys  
130 135 140

Ser Gln Val Arg Ser Gly Lys Ala Glu Gly Met Ile Ile Gly Ile Leu  
145 150 155 160

Leu Ala Lys Met His Leu Lys Glu Tyr Ile Gly Phe Ile Asp Ser Asp  
165 170 175

Asn Tyr Phe Pro Gly Ala Val Asn Glu Tyr Val Lys Ile Phe Ala Ala  
180 185 190

Gly Phe Gly Met Ala Thr Thr Pro Tyr Ser Asn Ile Arg Ile Ser Trp  
195 200 205

Arg Ser Lys Pro Lys Ile Val Asn Asn Ser Leu Gln Phe Pro Arg Trp  
 210 215 220

Gly Arg Ile Ser Glu Ser Ser Asn Lys Tyr Leu Asn Ala Leu Ile Ser  
 225 230 235 240

His Ile Thr Gly Phe Glu Arg Glu Ile Ile Thr Thr Gly Asn Ala Gly  
 245 250 255

Glu His Ala Leu Ser Met Ser Leu Ala Glu Asn Leu Asn Tyr Ser Ser  
 260 265 270

Gly Tyr Ser Val Glu Pro Tyr Glu Phe Ile Asn Ile Leu Glu Lys Phe  
 275 280 285

Gly Gly Leu Leu Pro Ser Asn Asn Pro Asp Ile Ile Glu Lys Gly Ile  
 290 295 300

Glu Ile Phe Gln Ile Glu Thr Arg Asn Pro His Phe His Glu Glu Lys  
 305 310 315 320

Gly Asn Asp His Leu Ala Gly Met Met Gln Glu Ser Leu Leu Ala Ile  
 325 330 335

Asn Asn Ser Lys Ile Cys Asn Thr Glu Leu Thr Arg Glu Ile Asn Asp  
 340 345 350

His Leu Leu Met Leu Gln Val Lys His Asn Asn Asp Met Thr Lys Leu  
 355 360 365

Asn Phe Lys Lys Lys His Leu Ile Met Asp Pro Ile Lys Ile Ile Pro  
 370 375 380

Ile Asp Lys Phe Ala Glu Phe Val Val Lys Asn Ser Lys Thr Phe Ile  
 385 390 395 400

Arg Ile Gly

<210> 22

<211> 1164

<212> DNA

&lt;213&gt; Crenarchaeote

&lt;400&gt; 22

```

atgagtgatg ctatcgaaaa tgtcctgatc cttcagggag gaggatcttt ggggtgcattt      60
ggttgcgggg tcta caaagc actagtaa ac aataacataa aacttgatat cctgtctggc      120
acatcaattg gcggtttgaa tgccacagtt attgccggca gtaaagaaga tcgtccagaa      180
aaatcattgg agaatttttg gatggaaata gctgatacta ataatggtaa tattaatata      240
taccttaatt tccccctttt tgaaagtcct tttcctgggc aaattccttt ccccttgga      300
tcagaatcaa cactatcatt ctacagctct gccatttatg gaaatagaaa aatctttctg      360
ccaagatggg gacctgaaaa tatcttttaa gatccacagt atttcacacc tagcaaatgg      420
acatatttgt atgaccattc acctttggta aaaaccttgg aaaagtacat tgattatagc      480
aaattacagc caaacggtaa gcccaacgca aggctaata taaccgcagt taacgtgatg      540
acggcgggagc cccttatttt tgacagtgcc aagcaacaaa taaccccaaa acacatactt      600
gcaaccactg cctatccaac atattttttt caatgggttg aattggaaaa agggcttttt      660
gcctgggatg gaagtttact aagcaatacc ccgctaagag aagtaataga cgcacgccc      720
gcaaaggaca aaagaatctt tcttgtcgag aactatccta aaaatattga aaagcttccg      780
tcaaacctac aggaagtcaa gcatagggca agagacataa tgttcagcga caagaccgtc      840
cacagtatac acatgtccaa agcaattacc cttcaactta agcttattga tgatctgtat      900
aaaatgctag agtattactt taattcagaa aaaatcgagg aaaaggagaa gtttgaaaaa      960
attcgtgcga gatacaaaaa agtttcagaa gaacacggcg cagagattaa aggtgtctac     1020
tatataacac gggacgagcc atccccctcc ctttatgaga atgcagactt ttcaaaaaat     1080
gcaataaagg catcgattaa tgatggagaa caaaaggctg acaggataat aaaagaaatc     1140
caaacgaaag gaaaacgaaa ataa.                                           1164

```

&lt;210&gt; 23

&lt;211&gt; 387

&lt;212&gt; PRT

&lt;213&gt; Crenarchaeote

&lt;400&gt; 23

```

Met Ser Asp Ala Ile Glu Asn Val Leu Ile Leu Gln Gly Gly Gly Ser
1           5           10           15

```

Leu Gly Ala Phe Gly Cys Gly Val Tyr Lys Ala Leu Val Asn Asn Asn  
 20 25 30

Ile Lys Leu Asp Ile Leu Ser Gly Thr Ser Ile Gly Gly Leu Asn Ala  
 35 40 45

Thr Val Ile Ala Gly Ser Lys Glu Asp Arg Pro Glu Lys Ser Leu Glu  
 50 55 60

Asn Phe Trp Met Glu Ile Ala Asp Thr Asn Asn Gly Asn Ile Asn Thr  
 65 70 75 80

Tyr Leu Asn Phe Pro Phe Phe Glu Ser Pro Phe Pro Gly Gln Ile Pro  
 85 90 95

Phe Pro Leu Ala Ser Glu Ser Thr Leu Ser Phe Tyr Ser Ser Ala Ile  
 100 105 110

Tyr Gly Asn Arg Lys Ile Phe Leu Pro Arg Trp Gly Pro Glu Asn Ile  
 115 120 125

Phe Lys Asp Pro Gln Tyr Phe Thr Pro Ser Lys Trp Thr Tyr Leu Tyr  
 130 135 140

Asp His Ser Pro Leu Val Lys Thr Leu Glu Lys Tyr Ile Asp Tyr Ser  
 145 150 155 160

Lys Leu Gln Pro Asn Gly Lys Pro Asn Ala Arg Leu Ile Ile Thr Ala  
 165 170 175

Val Asn Val Met Thr Ala Glu Pro Leu Ile Phe Asp Ser Ala Lys Gln  
 180 185 190

Gln Ile Thr Pro Lys His Ile Leu Ala Thr Thr Ala Tyr Pro Thr Tyr  
 195 200 205

Phe Phe Gln Trp Val Glu Leu Glu Lys Gly Leu Phe Ala Trp Asp Gly  
 210 215 220

Ser Leu Leu Ser Asn Thr Pro Leu Arg Glu Val Ile Asp Ala Ser Pro  
 225 230 235 240

Ala Lys Asp Lys Arg Ile Phe Leu Val Glu Asn Tyr Pro Lys Asn Ile  
 245 250 255

Glu Lys Leu Pro Ser Asn Leu Gln Glu Val Lys His Arg Ala Arg Asp  
260 265 270

Ile Met Phe Ser Asp Lys Thr Val His Ser Ile His Met Ser Lys Ala  
275 280 285

Ile Thr Leu Gln Leu Lys Leu Ile Asp Asp Leu Tyr Lys Met Leu Glu  
290 295 300

Tyr Tyr Phe Asn Ser Glu Lys Ile Glu Glu Lys Glu Lys Phe Glu Lys  
305 310 315 320

Ile Arg Ala Arg Tyr Lys Lys Val Ser Glu Glu His Gly Ala Glu Ile  
325 330 335

Lys Gly Val Tyr Tyr Ile Thr Arg Asp Glu Pro Ser Pro Ser Leu Tyr  
340 345 350

Glu Asn Ala Asp Phe Ser Lys Asn Ala Ile Lys Ala Ser Ile Asn Asp  
355 360 365

Gly Glu Gln Lys Ala Asp Arg Ile Ile Lys Glu Ile Gln Thr Lys Gly  
370 375 380

Lys Arg Lys  
385

<210> 24

<211> 882

<212> DNA

<213> Crenarchaeote

<400> 24

atggaactta acgcagcagt aattgtgaaa ctgcagccgg atttttctga agggaatgta 60  
agctataatt cagacggaac acttaacaga gcagaaacaa aaaacatttt ggggccccat 120  
agcgagcag catccctagc agccctgtac tcaaaagtaa aacatggaac gcatgtttct 180  
gtgggcacaa tgggtcctcc aatagcagaa tcggccttac agcaatctca actgatttgc 240  
gacgctgatg aactgcatct ttatagtgat cgcattcttg caggagccga caccctggcc 300  
acagctgaag ttttgatagc aggaataaaa aaaatggcaa atggtcaaga tgtggacatt 360

```

gttttctcag ggcacagggc atctgatggc gaaacagggc aaacaggacc ccagacagca 420
tggaattag gttatccgtt ccttggaat gttattgatt acgatattga cgttgtgaag 480
agaattgtaa gggtagaacg tctaatacag atttacggtc atcctgatat tatagaggag 540
atggaggcgc ctctaccggt ttttatcaca ctggacccat cctacaatcc gtcttttaac 600
acggtatccc aaaggctcag actagcacga aacctacagg aagcccatga tagatcacia 660
aggtataagg aatatctcaa aactttcaat gccatggaac tagaagtcaa tccaaagtct 720
gtcggactgc ctggctctcc caccatagtt tataaagttg aaaaaatacc aagggcaaag 780
gcaaatagaa aagcagatgt tgtggatggg tctaaccagg atagtctaag gcagggtgca 840
cgccgaatcc atgatgtttt agggggtgta gtcataaagt ga 882

```

&lt;210&gt; 25

&lt;211&gt; 293

&lt;212&gt; PRT

&lt;213&gt; Crenarchaeote

&lt;400&gt; 25

```

Met Glu Leu Asn Ala Ala Val Ile Val Lys Leu Glu Pro Asp Phe Ser
1           5           10           15

```

```

Glu Gly Asn Val Ser Tyr Asn Ser Asp Gly Thr Leu Asn Arg Ala Glu
20           25           30

```

```

Thr Lys Asn Ile Leu Gly Pro His Ser Ala Ala Ala Ser Leu Ala Ala
35           40           45

```

```

Leu Tyr Ser Lys Val Lys His Gly Thr His Val Ser Val Gly Thr Met
50           55           60

```

```

Gly Pro Pro Ile Ala Glu Ser Ala Leu Gln Gln Ser Gln Leu Ile Cys
65           70           75           80

```

```

Asp Ala Asp Glu Leu His Leu Tyr Ser Asp Arg Ile Phe Ala Gly Ala
85           90           95

```

```

Asp Thr Leu Ala Thr Ala Glu Val Leu Ile Ala Gly Ile Lys Lys Met
100          105          110

```



Ala Asn Gly Gln Asp Val Asp Ile Val Phe Ser Gly His Arg Ala Ser  
115 120 125

Asp Gly Glu Thr Gly Gln Thr Gly Pro Gln Thr Ala Trp Lys Leu Gly  
130 135 140

Tyr Pro Phe Leu Gly Asn Val Ile Asp Tyr Asp Ile Asp Val Val Lys  
145 150 155 160

Arg Ile Val Arg Val Gln Arg Leu Ile Lys Ile Tyr Gly His Pro Asp  
165 170 175

Ile Ile Glu Glu Met Glu Ala Pro Leu Pro Val Phe Ile Thr Leu Asp  
180 185 190

Pro Ser Tyr Asn Pro Ser Phe Asn Thr Val Ser Gln Arg Leu Arg Leu  
195 200 205

Ala Arg Asn Leu Gln Glu Ala His Asp Arg Ser Gln Arg Tyr Lys Glu  
210 215 220

Tyr Leu Lys Thr Phe Asn Ala Met Glu Leu Glu Val Asn Pro Lys Ser  
225 230 235 240

Val Gly Leu Pro Gly Ser Pro Thr Ile Val Tyr Lys Val Glu Lys Ile  
245 250 255

Pro Arg Ala Lys Ala Asn Arg Lys Ala Asp Val Val Asp Gly Ser Asn  
260 265 270

Gln Asp Ser Leu Arg Gln Val Ala Arg Arg Ile His Asp Val Leu Gly  
275 280 285

Gly Val Val Ile Lys  
290

<210> 26

<211> 1284

<212> DNA

<213> Crenarchaeote

<400> 26

gtgacatcat cactatctgc catacctgac gctaaactag acgaaaggcc aaaccaaatt

60

```

gccccatgtta atgacaaccc agaaaaagaa aggggagaca acaacaggca tctgtatgtt 120
gtgatagaac aagaggaagg caccatatta cctgtgagtt ttgaaatgct tggtagaggca 180
agaaggctaa tggatgattt taatcacaaa tacaagccag aggaaaaagt ggttgcgatt 240
atactcggcc ataacatcaa gcacctgtgc caggaactaa tccaccatgg tgcagacgca 300
gtgatttatg ccgaccaccc ggagctccgc caccaagaa atcttcttta taaaagggtt 360
gtctgccaaa ttgctacgga caaagagagc gccgccagaa tttggccatc aaatcccgat 420
tttaacagac cccgttacat gtttttttcc gcagatgaca caggaaggca tttatcatca 480
accgttttgg cagaattgca atcagggtg gcacagaca taaacaaact tgttatcaat 540
gatttagaaa taaggcatga acacaagaca aagggtaaac ccattgtcta tgaaaagaca 600
cttgaaatgt acagaccaga cttttcaggc tttcttttga ccaccatact ctgcttggat 660
aatataaatc ccgagaacag aaggaaattc catccacagg catgcagtat aatcccaggc 720
gtctttcccc aaatggaagg agatacggat agaaagggtta ccataataga gttcagccca 780
accatagccc aggaagacct tagaataaaa ataatcaaca gaagagtaat caaaagcaaa 840
gtcgatttta gcaataaaaa aataatcggt agtttttgaa ggggaataaa ggagtctccc 900
gaacaaaaca taaaactgat agagaacctt gcaaaggaaa tagaagcaga aataggaata 960
tcactgccc tttcaaagaa accctatcca ataagcgaaa gtctgtcgtc aacctatatg 1020
attcctgaca gggttatcgg cacaagcgga agaaaggtaa atcctcaggt gtattttgca 1080
ataggaataa gcggggctgt ccaacacata gccgggatga aagaatcgga atttgtgatt 1140
tccatcaatc cagacagtga agctcccata atagatgaat ccgatgtttt aatcaaagga 1200
aaaatcgagc aggtgctgcc tctcctgata aatgaattaa aaaaatacaa agagagactg 1260
caaataccac aggagataga atga 1284

```

&lt;210&gt; 27

&lt;211&gt; 427

&lt;212&gt; PRT

&lt;213&gt; Crenarchaeote

&lt;400&gt; 27

```

Met Thr Ser Ser Leu Ser Ala Ile Pro Asp Ala Lys Leu Asp Glu Arg
1           5           10           15

```

Pro Asn Gln Asn Ala His Val Asn Asp Asn Pro Glu Lys Glu Arg Gly  
20 25 30

Asp Asn Asn Arg His Leu Tyr Val Val Ile Glu Gln Glu Glu Gly Thr  
35 40 45

Ile Leu Pro Val Ser Phe Glu Met Leu Gly Glu Ala Arg Arg Leu Met  
50 55 60

Asp Asp Phe Asn His Lys Tyr Lys Pro Glu Glu Lys Val Val Ala Ile  
65 70 75 80

Ile Leu Gly His Asn Ile Lys His Leu Cys Gln Glu Leu Ile His His  
85 90 95

Gly Ala Asp Ala Val Ile Tyr Ala Asp His Pro Glu Leu Arg His Pro  
100 105 110

Arg Asn Leu Leu Tyr Thr Lys Val Val Cys Gln Ile Ala Thr Asp Lys  
115 120 125

Glu Ser Ala Ala Arg Ile Trp Pro Ser Asn Pro Asp Phe Asn Arg Pro  
130 135 140

Arg Tyr Met Phe Phe Ser Ala Asp Asp Thr Gly Arg His Leu Ser Ser  
145 150 155 160

Thr Val Leu Ala Glu Leu Gln Ser Gly Leu Ala Ser Asp Ile Asn Lys  
165 170 175

Leu Val Ile Asn Asp Leu Glu Ile Arg His Glu His Lys Thr Lys Gly  
180 185 190

Lys Pro Ile Val Tyr Glu Lys Thr Leu Glu Met Tyr Arg Pro Asp Phe  
195 200 205

Ser Gly Phe Leu Trp Thr Thr Ile Leu Cys Leu Asp Asn Ile Asn Pro  
210 215 220

Glu Asn Arg Arg Lys Phe His Pro Gln Ala Cys Ser Ile Ile Pro Gly  
225 230 235 240

Val Phe Pro Gln Met Glu Gly Asp Thr Asp Arg Lys Gly Thr Ile Ile  
245 250 255

Glu Phe Ser Pro Thr Ile Ala Gln Glu Asp Leu Arg Ile Lys Ile Ile  
 260 265 270

Asn Arg Arg Val Ile Lys Ser Lys Val Asp Phe Ser Asn Lys Lys Ile  
 275 280 285

Ile Val Ser Phe Gly Arg Gly Ile Lys Glu Ser Pro Glu Gln Asn Ile  
 290 295 300

Lys Leu Ile Glu Asn Leu Ala Lys Glu Ile Glu Ala Glu Ile Gly Ile  
 305 310 315 320

Ser Leu Pro Ile Ser Lys Lys Pro Tyr Pro Ile Ser Glu Ser Leu Ser  
 325 330 335

Ser Thr Tyr Met Ile Pro Asp Arg Val Ile Gly Thr Ser Gly Arg Lys  
 340 345 350

Val Asn Pro Gln Val Tyr Phe Ala Ile Gly Ile Ser Gly Ala Val Gln  
 355 360 365

His Ile Ala Gly Met Lys Glu Ser Glu Phe Val Ile Ser Ile Asn Pro  
 370 375 380

Asp Ser Glu Ala Pro Ile Ile Asp Glu Ser Asp Val Leu Ile Lys Gly  
 385 390 395 400

Lys Ile Glu Gln Val Leu Pro Leu Leu Ile Asn Glu Leu Lys Lys Tyr  
 405 410 415

Lys Glu Arg Leu Gln Ile Pro Gln Glu Ile Glu  
 420 425

<210> 28

<211> 1878

<212> DNA

<213> Crenarchaeote

<400> 28

atgacaatgg aaagttttga tgtggcgata attggtggag ggtctgctgg acttgcgga 60

cttgagcacc tctccaattt gggaaaacag gcaatcctca tagaggcagg aaaaaaata 120

ggaacaaaa acgtgtctgg gggcatattg tattccaaaa aaacagcaac tggaaaggtc 180

cacaatgtag aagatgtgtt tgataatfff ctggcagacg ctccgctgga aaggaagata	240
ataaaataca tgcttcacgc cgtctcaagg gaaaaagcgt tctctctgga cctgactttg	300
gcacacgact atcaaacgaa ttttggttac accgtcctgc tcaacaaact actttcatgg	360
tttgcaaggg aagcatctca aagtgcagaa aaactgggtg gagggataat aacaggtgtc	420
catttaaggt cgataatctg gaaagatgac agtaccataa ttatagagac agatgaactt	480
gagccgttcc aggtaaaggc agtcattgca gctgacgggg ttaactcaga gggtgcgcaa	540
ataacaggtg ccagaagcaa gttcacaccg tctgacctct accagggcgt aaaggtgggtg	600
gcaaaattac cagaggggtt gcttgaagag agattcgggg tctcgaaaaa cgaggagcgc	660
gctcaccttt tttcaggcga cataacgcta aaccacattg gagggagggtt cttttacaca	720
aacagggaca ccatctcaat tggcgcagta taccattatg actctctaata tgaaaagcct	780
acagagccca atgcgctggc caatgcgtta ctgtcaaata cgtttgtgat ggaattgata	840
aaggacgagg ttccaaggat caaggaggac tacagggatc tttcaaagga tgaagaacta	900
aggattaggt tcaaatacaa taaattgata aaaagctgga atgacctaca ccacacatat	960
tattcaccat ctgccgttgc agagcttgtg gcgcaggga aatacaaatc aaggaggag	1020
atcaaggaca aaattgattc attgtacaat gagcttgtaa caaaatacaa cacagaattt	1080
gaaacaaatt acgtggagtt agagtacagc gccaaactgg ttccagatgg aaaaagggtgc	1140
agaatgaaaa aaccctactt taaaaacatc ttatttgtcg gtgatgctgc gggcaggggc	1200
attttccttg ggccacgcat agagggcctc aacgtaggca ttgatgacgc ggttagggcc	1260
gcagaagctg tctcaaagtc aatagatcaa aataactttc agtttgacaa cattggtgaa	1320
cgctacacta aatcagtgga tgaaagtcca tataccgcag acatgagcag gatcgacgca	1380
aactatctca aagccgttct tgattgcaca aaaaagggtc ccaaaaacac tcttgggttt	1440
aagtatgggt ctattgtcaa attgatgtca aatagcacct ttaggaatgt atccatagga	1500
attgcaaact ctatagggtg caaaaggctt ttacctgtga ttgagtcaga caaaacctac	1560
aatcaaattc ccatcgagat tgcggagaga aatggcaaag atttgcgga aagctattcc	1620
atagagattc ccaccattgc cgagcgtatt gctaacttga actataatga cgattcactg	1680
tcacacatca aggttttgaa ctgcgaaagt gactttatga aaaaaatggt ccaactgtgc	1740
cctaccaaata gctacagtat tgagaatgag cggataatgc tacagcacga aggatgcata	1800
gagtgtggga catgcgcaag agaaacagaa tggaggcatc ctctgtggga aaaaggaata	1860
atctataatt acgggtaa	1878

&lt;210&gt; 29

&lt;211&gt; 625

&lt;212&gt; PRT

&lt;213&gt; Crenarchaeote

&lt;400&gt; 29

Met Thr Met Glu Ser Phe Asp Val Ala Ile Ile Gly Gly Gly Ser Ala  
 1 5 10 15

Gly Leu Ala Ala Leu Glu His Leu Ser Asn Leu Gly Lys Gln Ala Ile  
 20 25 30

Leu Ile Glu Ala Gly Lys Lys Ile Gly Thr Lys Asn Val Ser Gly Gly  
 35 40 45

Ile Leu Tyr Ser Lys Lys Thr Ala Thr Gly Lys Val His Asn Val Glu  
 50 55 60

Asp Val Phe Asp Asn Phe Leu Ala Asp Ala Pro Leu Glu Arg Lys Ile  
 65 70 75 80

Ile Lys Tyr Met Leu His Ala Val Ser Arg Glu Lys Ala Phe Ser Leu  
 85 90 95

Asp Leu Thr Leu Ala His Asp Tyr Gln Thr Asn Phe Gly Tyr Thr Val  
 100 105 110

Leu Leu Asn Lys Leu Leu Ser Trp Phe Ala Arg Glu Ala Ser Gln Ser  
 115 120 125

Ala Glu Lys Leu Gly Gly Gly Ile Ile Thr Gly Val His Leu Arg Ser  
 130 135 140

Ile Ile Trp Lys Asp Asp Ser Thr Ile Ile Ile Glu Thr Asp Glu Leu  
 145 150 155 160

Glu Pro Phe Gln Val Lys Ala Val Ile Ala Ala Asp Gly Val Asn Ser  
 165 170 175

Glu Val Ala Gln Ile Thr Gly Ala Arg Ser Lys Phe Thr Pro Ser Asp  
 180 185 190

Leu Tyr Gln Gly Val Lys Val Val Ala Lys Leu Pro Glu Gly Leu Leu  
195 200 205

Glu Glu Arg Phe Gly Val Ser Glu Asn Glu Gly Ala Ala His Leu Phe  
210 215 220

Ser Gly Asp Ile Thr Leu Asn His Ile Gly Gly Gly Phe Leu Tyr Thr  
225 230 235 240

Asn Arg Asp Thr Ile Ser Ile Gly Ala Val Tyr His Tyr Asp Ser Leu  
245 250 255

Ile Glu Lys Pro Thr Glu Pro Asn Ala Leu Val Asn Ala Leu Leu Ser  
260 265 270

Asn Pro Phe Val Met Glu Leu Ile Lys Asp Glu Val Pro Arg Ile Lys  
275 280 285

Glu Asp Tyr Arg Asp Leu Ser Lys Asp Glu Glu Leu Arg Ile Arg Phe  
290 295 300

Lys Ser Asn Lys Leu Ile Lys Ser Trp Asn Asp Leu His His Thr Tyr  
305 310 315 320

Tyr Ser Pro Ser Ala Val Ala Glu Leu Val Ala Gln Gly Lys Tyr Lys  
325 330 335

Ser Arg Glu Glu Ile Lys Asp Lys Ile Asp Ser Leu Tyr Asn Glu Leu  
340 345 350

Val Thr Lys Tyr Asn Thr Glu Phe Glu Thr Asn Tyr Val Glu Leu Glu  
355 360 365

Tyr Ser Ala Lys Leu Val Pro Asp Gly Lys Arg Cys Arg Met Lys Lys  
370 375 380

Pro Tyr Phe Lys Asn Ile Leu Phe Val Gly Asp Ala Ala Gly Arg Gly  
385 390 395 400

Ile Phe Leu Gly Pro Arg Ile Glu Gly Leu Asn Val Gly Ile Asp Asp  
405 410 415

Ala Val Arg Ala Ala Glu Ala Val Ser Lys Ser Ile Asp Gln Asn Asn  
420 425 430

Phe Gln Phe Asp Asn Ile Gly Glu Arg Tyr Thr Lys Ser Val Asp Glu  
 435 440 445  
 Ser Pro Tyr Thr Ala Asp Met Ser Arg Ile Asp Ala Asn Tyr Leu Lys  
 450 455 460  
 Ala Val Leu Asp Cys Thr Lys Lys Val Pro Lys Asn Thr Leu Gly Phe  
 465 470 475 480  
 Lys Tyr Gly Ser Ile Val Lys Leu Met Ser Asn Ser Thr Phe Arg Asn  
 485 490 495  
 Val Ser Ile Gly Ile Ala Asn Ser Ile Gly Tyr Lys Arg Leu Leu Pro  
 500 505 510  
 Val Ile Glu Ser Asp Lys Thr Tyr Asn Gln Ile Pro Ile Glu Ile Ala  
 515 520 525  
 Glu Arg Asn Gly Lys Asp Leu Arg Lys Ser Tyr Ser Ile Glu Ile Pro  
 530 535 540  
 Thr Ile Ala Glu Arg Ile Ala Asn Leu Asn Tyr Asn Asp Asp Ser Leu  
 545 550 555 560  
 Ser His Ile Lys Val Leu Asn Ser Gln Ser Asp Phe Met Lys Lys Met  
 565 570 575  
 Val Gln Leu Cys Pro Thr Lys Cys Tyr Ser Ile Glu Asn Glu Arg Ile  
 580 585 590  
 Met Leu Gln His Glu Gly Cys Ile Glu Cys Gly Thr Cys Ala Arg Glu  
 595 600 605  
 Thr Glu Trp Arg His Pro Arg Gly Glu Lys Gly Ile Ile Tyr Asn Tyr  
 610 615 620

Gly  
625

<210> 30

<211> 2238

<212> DNA

<213> Crenarchaeote



<400> 30  
 ttggaagggtt cttctctaata acataataat aatctcctatg acattggcac aaataatgat 60  
 aatgtatgtg aaaataaata cattgacgca aaccccggtt tgtcgacaaa acgcgggttt 120  
 ggtgacgtca acaataacga gaacgataat gatggtggtg ttgacgccgg tgcacccacc 180  
 acaaagggtgt actatggccc tgaaaacgca aacaacgcca ttttgagggt catagacagg 240  
 gccaatgtga agatagactc ttgcataaac tccgtggccc cgtccgtgat gataggggtt 300  
 gacgccataa gggagaaaag ggttgacgcg gtcaaaaaca ggggccttaa actgcggtat 360  
 gtaaccgaaa taacaaagga caacgtcggc tatgtcaagg agatgctctc gttttcggag 420  
 attaggcacc tggatgggct gaagggaac tttgagggtg ccgaccagag ggagtatgtg 480  
 gctgtcgcca cccttcatgc ggcacagtca atacccagc ttttgttcag caacctccct 540  
 gagattgcag agcagcagca gtttgtgttt gacagctttt ggggcagggc gttgcccgca 600  
 gagcacagga taaaggagct ggaggatggg gttgtcatgc ccgtctcact ggtcttctcc 660  
 aactacaagg acgcgggtcca aagggtgtt gaaatgataa gcagggccaa aagggtgata 720  
 ctgataatgt actccacggt taacgcgttc cacctgcagg aaaaaggcgg cactctgcaa 780  
 ctcttgaagg agatggtgga gcaaaacgac agcctgagga tcaacatcct cagccgatg 840  
 gatgcctcag tgcgagagtc cttgtccttg aggctcctca caaaatacag gcccaacatc 900  
 caagtccagg acattgcgcc aagcattggc atcaagataa agacactggt tgtggacaga 960  
 aaggagtgc tggatgatga gctgatacac gcaaggagg aggtggcaac cgcgcgaatc 1020  
 ggcttttcaa tctactccaa cagcgagcca acggtattgt cttactcgtc catatttgag 1080  
 gtctctatg accagagtgt cctgttccag cagcttgacc aaaacgacaa agtcaaaagc 1140  
 gagttcataa acgtggctgc gcatgagttg cgaacgcaa tcatgccat cctaaacggt 1200  
 gtggagatac tggaggagaa gcttggcgaa agaaaaacag agtttcagcg ggagcttgac 1260  
 atgataacaa gaaacgcgtc ccggctgcag aaccttgccg aaagcattct gcaggtgagc 1320  
 agaatcgaaa gcggaagctt tagcctggac atccaaaaaa atgtggatat ccacaacctg 1380  
 atttcccagg tgatagagga cattgagaaa aaatacgcct acaaggagaa ggcaaacaag 1440  
 gtggcgatag tgtttttgcc atctgacggc aacagaaatg gcgggtactc cagaggtggc 1500  
 ggcggcgcaa aggcagaagg ggtaaaggca gcggcaggag caaaacaggc gcaaaaagag 1560  
 acgcagcaaa aagagcagtg ggtagaacc gttaatggcc ccaaccacct tttgtatgta 1620  
 gactgtgatc cgcaaaagat aagccagggt gttttcaacc tgctggacaa cgcaatgaag 1680  
 ttcaccaatg acggcaagat tgttgtttcc acggcagtg tgggtgagtc ttctcccttc 1740

acttccacct ctcaggaaag tgatacctca aacactgcta cagctggtaa aggcaatggg 1800  
 ggcagagtgg atagcagcag cgacagcgac aacgggtggtg gtgacaatgg tggtgaccac 1860  
 atcggggaggc agaaagaagg cgcggtgcta gtcacagtgc aggacaccgg ggttggggctc 1920  
 aactccaaaa taagggatca gctgtttcag aaatttgtca caaagtcaaa ccagggaacc 1980  
 ggccttggcc tatacctgtc aaggaaaatt gttgaggagc atggtggaaa aatatggttt 2040  
 gaggagacaa acagcaaggg cggcaacagc agcagcagga acaacactaa agataaagac 2100  
 gaaggcattg atgaaatact gcaccacctt ggcagtgaag gaaaaatagg cgccacattc 2160  
 aaatttgtca tacctgtctc cctgccttcc catatgccga caaaagacat gccagaaaaa 2220  
 aacgatgaag gaaaaatga 2238

<210> 31

<211> 745

<212> PRT

<213> Crenarchaeote

<400> 31

Met Glu Gly Ser Ser Leu Ile His Asn Asn Asn Leu His Asp Ile Gly  
 1 5 10 15

Thr Asn Asn Asp Asn Val Cys Glu Asn Lys Tyr Ile Asp Ala Asn Pro  
 20 25 30

Gly Leu Ser His Lys Arg Gly Phe Gly Asp Val Asn Asn Asn Glu Asn  
 35 40 45

Asp Asn Asp Gly Gly Val Asp Ala Gly Ala Pro Thr Thr Lys Val Tyr  
 50 55 60

Tyr Gly Pro Glu Asn Ala Asn Asn Ala Ile Leu Arg Phe Ile Asp Arg  
 65 70 75 80

Ala Asn Val Lys Ile Asp Ser Cys Ile Asn Ser Val Ala Pro Ser Val  
 85 90 95

Met Ile Gly Val Asp Ala Ile Arg Glu Lys Arg Val Asp Ala Val Lys  
 100 105 110

Asn Arg Gly Leu Lys Leu Arg Tyr Val Thr Glu Ile Thr Lys Asp Asn  
 115 120 125

Val Gly Tyr Val Lys Glu Met Leu Ser Phe Ser Glu Ile Arg His Leu  
 130 135 140

Asp Gly Leu Lys Gly Asn Phe Glu Val Ala Asp Gln Arg Glu Tyr Val  
 145 150 155 160

Ala Val Ala Thr Leu His Ala Ala Gln Ser Ile Pro Gln Leu Leu Phe  
 165 170 175

Ser Asn Leu Pro Glu Ile Ala Glu Gln Gln Gln Phe Val Phe Asp Ser  
 180 185 190

Phe Trp Gly Arg Ala Leu Pro Ala Glu His Arg Ile Lys Glu Leu Glu  
 195 200 205

Asp Gly Val Val Met Pro Val Ser Leu Val Phe Ser Asn Tyr Lys Asp  
 210 215 220

Ala Val Gln Arg Glu Phe Glu Met Ile Ser Arg Ala Lys Arg Glu Ile  
 225 230 235 240

Leu Ile Met Tyr Ser Thr Val Asn Ala Phe His Leu Gln Glu Lys Gly  
 245 250 255

Gly Thr Leu Gln Leu Leu Lys Glu Met Val Glu Gln Asn Asp Ser Leu  
 260 265 270

Arg Ile Asn Ile Leu Thr Pro Met Asp Ala Ser Val Arg Glu Ser Leu  
 275 280 285

Ser Leu Arg Leu Leu Thr Lys Tyr Arg Pro Asn Ile Gln Val Gln Asp  
 290 295 300

Ile Ala Pro Ser Ile Gly Ile Lys Ile Lys Thr Leu Val Val Asp Arg  
 305 310 315 320

Lys Glu Ser Leu Val Met Glu Leu Ile His Ala Arg Glu Glu Val Ala  
 325 330 335

Thr Ala Ala Ile Gly Phe Ser Ile Tyr Ser Asn Ser Glu Pro Thr Val  
 340 345 350

Leu Ser Tyr Ser Ser Ile Phe Glu Val Leu Tyr Asp Gln Ser Val Leu  
355 360 365

Phe Gln Gln Leu Asp Gln Asn Asp Lys Val Lys Ser Glu Phe Ile Asn  
370 375 380

Val Ala Ala His Glu Leu Arg Thr Pro Ile Met Pro Ile Leu Asn Gly  
385 390 395 400

Val Glu Ile Leu Glu Glu Lys Leu Gly Glu Arg Lys Thr Glu Phe Gln  
405 410 415

Arg Glu Leu Asp Met Ile Thr Arg Asn Ala Ser Arg Leu Gln Asn Leu  
420 425 430

Ala Glu Ser Ile Leu Gln Val Ser Arg Ile Glu Ser Gly Ser Phe Ser  
435 440 445

Leu Asp Ile Gln Lys Asn Val Asp Ile His Asn Leu Ile Ser Gln Val  
450 455 460

Ile Glu Asp Ile Glu Lys Lys Tyr Ala Tyr Lys Glu Lys Ala Asn Lys  
465 470 475 480

Val Ala Ile Val Phe Leu Pro Ser Asp Gly Asn Arg Asn Gly Gly Tyr  
485 490 495

Ser Arg Gly Gly Gly Gly Ala Lys Ala Glu Gly Val Lys Ala Ala Ala  
500 505 510

Gly Ala Lys Gln Ala Gln Lys Glu Thr Gln Gln Lys Glu Gln Trp Val  
515 520 525

Glu Pro Val Asn Gly Pro Asn His Leu Leu Tyr Val Asp Cys Asp Pro  
530 535 540

Gln Lys Ile Ser Gln Val Val Phe Asn Leu Leu Asp Asn Ala Met Lys  
545 550 555 560

Phe Thr Asn Asp Gly Lys Ile Val Val Ser Thr Ala Val Met Gly Glu  
565 570 575

Ser Ser Pro Phe Thr Ser Thr Ser Gln Glu Ser Asp Thr Ser Asn Thr  
580 585 590

Ala Thr Ala Gly Lys Gly Asn Gly Gly Arg Val Asp Ser Ser Ser Asp  
595 600 605

Ser Asp Asn Gly Gly Gly Asp Asn Gly Gly Asp His Ile Gly Arg Gln  
610 615 620

Lys Glu Gly Ala Val Leu Val Thr Val Gln Asp Thr Gly Val Gly Leu  
625 630 635 640

Asn Ser Lys Ile Arg Asp Gln Leu Phe Gln Lys Phe Val Thr Lys Ser  
645 650 655

Asn Gln Gly Thr Gly Leu Gly Leu Tyr Leu Ser Arg Lys Ile Val Glu  
660 665 670

Glu His Gly Gly Lys Ile Trp Phe Glu Glu Thr Asn Ser Lys Gly Gly  
675 680 685

Asn Ser Ser Ser Arg Asn Asn Thr Lys Asp Lys Asp Glu Gly Ile Asp  
690 695 700

Glu Ile Leu His His Leu Gly Ser Glu Gly Lys Ile Gly Ala Thr Phe  
705 710 715 720

Lys Phe Val Ile Pro Val Ser Leu Pro Ser His Met Pro Thr Lys Asp  
725 730 735

Met Pro Glu Lys Asn Asp Glu Gly Lys  
740 745

<210> 32

<211> 519

<212> DNA

<213> Crenarchaeote

<400> 32

ttgcaaagca gtcattctttc taaaataatc acaatttgca gaatgccgtc acttcatctt 60

gttgcatatg gtttaatttt ggatattttc gaaagcccaa tcacaagggt aaacggtaga 120

acaagtcact tgattattaa aatatatcca catatggata acaatacaag gatgagttct 180

ttagcaatcg agtttttttt atcccttttt tcaataacgt tacttttctaa aagaatatac 240

caaccagtga aatcaaagtc atatacctac catgacaagc atccatttca gtacaagatg 300

gaggattatg caaaccacaa caaaattgta gactataaaa actgcttact tttttttcaa 360  
 gtatcgatgt tacaaaaaaa taaaataatt aggattcggg ttccagggtt gttttataca 420  
 ggtggctgga tttccctcac actaaagttt ttgatatcca catcatttgc accatccac 480  
 ctgaaagtag caatggggcc tcccaggat ataatctga 519

<210> 33

<211> 172

<212> PRT

<213> Crenarchaeote

<400> 33

Met Gln Ser Ser His Leu Ser Lys Ile Ile Thr Ile Cys Arg Met Pro  
 1 5 10 15

Ser Leu His Leu Val Ala Tyr Gly Leu Ile Leu Asp Ile Phe Glu Ser  
 20 25 30

Pro Ile Thr Arg Leu Asn Gly Arg Thr Ser His Leu Ile Ile Lys Ile  
 35 40 45

Tyr Pro His Met Asp Asn Asn Thr Arg Met Ser Ser Leu Ala Ile Glu  
 50 55 60

Phe Phe Leu Ser Leu Phe Ser Ile Thr Leu Leu Ser Lys Arg Ile Tyr  
 65 70 75 80

Gln Pro Val Lys Ser Lys Ser Tyr Thr Tyr His Asp Lys His Pro Phe  
 85 90 95

Gln Tyr Lys Met Glu Asp Tyr Ala Asn His Asn Lys Ile Val Asp Tyr  
 100 105 110

Lys Asn Cys Leu Leu Phe Phe Gln Val Ser Met Leu Gln Lys Asn Lys  
 115 120 125

Ile Ile Arg Ile Arg Val Pro Gly Leu Phe Tyr Thr Gly Gly Trp Ile  
 130 135 140

Ser Leu Thr Leu Lys Phe Leu Ile Ser Thr Ser Phe Ala Pro Ser His  
 145 150 155 160

Leu Lys Val Ala Met Gly Pro Pro Gln Asp Ile Ile  
 165 170

<210> 34

<211> 1008

<212> DNA

<213> Crenarchaeote

<400> 34

```

acactgctaa caagcggagg cgcacctgtg cccgcaaccg taagcatgaa ttcaccaacc      60
aacacagttg cgaccctaaa cccctctgca gatttaacac ctggtgccac atacactgcc      120
agaataacaa ccggtgctac ggatgcgact ggtgtcccat tggctgccga caaggatatgg      180
acgttctctg ttgcccttc tggaggcgga gggacattag accagtttgg gataaccag      240
atttaccctcg ataaggcggg tgggtggagaa aaatggttta tgaatatgca aaaccggaac      300
aatgatccac gaacaaaccc acctgacatg gacctaaacc cagatggcag ttggaacggt      360
aatgacgatc aggtcagata taacgtgttt acatcatcag ggtaccatcc agaggatatt      420
gagacttacg atcactcggg actcgcaaca caaggataca tgcagtatcc aaatgattgg      480
aagaatgtgg aaatgacggg tattgtaagg gttaatagtg gagatgattc tgaaaatttc      540
gcttggatatg acaggggtgg taggcactat gatggcgaag gatgcgaggg ctcagcatat      600
aaagcagatc tattctatga tggaagggtt aggcttgcaa aagagcagtg gcatgtctcc      660
tatgtgtttt caagcactac cacaccctca ccttcggcgt ctagttttga tagattcatt      720
ggattttaaag ccatgatcta taaccaccaa ttggctgggt gtgagaccgt agtcaccact      780
gaaatatggg tagacagaaa cccgtagatg cggactctga agaacaattg gcaaaaggta      840
tacacattca ctgactcagg tgggttttga aatgatgggt aagagtgtgg tggtgagccg      900
gatcagatta tctctgggg aggccccatt gctactttca ggtgggatgg tgcaaagat      960
gtggatatca aaaactttag tgtgagggaa atccagccac ctgtataa      1008

```

<210> 35

<211> 335

<212> PRT

<213> Crenarchaeote

&lt;400&gt; 35

Thr Leu Leu Thr Ser Gly Gly Ala Pro Val Pro Ala Thr Val Ser Met  
1 5 10 15

Asn Ser Pro Thr Asn Thr Val Ala Thr Leu Asn Pro Ser Ala Asp Leu  
20 25 30

Thr Pro Gly Ala Thr Tyr Thr Ala Arg Ile Thr Thr Gly Ala Thr Asp  
35 40 45

Ala Thr Gly Val Pro Leu Ala Ala Asp Lys Val Trp Thr Phe Ser Val  
50 55 60

Ala Pro Ser Gly Gly Gly Gly Thr Leu Asp Gln Phe Gly Ile Thr Gln  
65 70 75 80

Ile Tyr Pro Asp Lys Ala Gly Gly Gly Glu Lys Trp Phe Met Asn Met  
85 90 95

Gln Asn Pro Asn Asn Asp Pro Arg Thr Asn Pro Pro Asp Met Asp Leu  
100 105 110

Asn Pro Asp Gly Ser Trp Asn Val Asn Asp Asp Gln Val Arg Tyr Asn  
115 120 125

Val Phe Thr Ser Ser Gly Tyr His Pro Glu Asp Ile Glu Thr Tyr Asp  
130 135 140

His Ser Val Leu Ala Thr Gln Gly Tyr Met Gln Tyr Pro Asn Asp Trp  
145 150 155 160

Lys Asn Val Glu Met Thr Gly Ile Val Arg Val Asn Ser Gly Asp Asp  
165 170 175

Ser Glu Asn Phe Ala Trp Tyr Asp Arg Gly Gly Arg His Tyr Asp Gly  
180 185 190

Glu Gly Cys Glu Gly Ser Ala Tyr Lys Ala Asp Leu Phe Tyr Asp Gly  
195 200 205

Arg Val Arg Leu Ala Lys Glu Gln Trp His Val Ser Tyr Val Phe Ser  
210 215 220



Ser Thr Thr Thr Pro Ser Pro Ser Ala Ser Ser Phe Asp Arg Phe Ile  
225 230 235 240

Gly Phe Lys Ala Met Ile Tyr Asn His Gln Leu Ala Gly Gly Glu Thr  
245 250 255

Val Val Thr Thr Glu Ile Trp Val Asp Arg Asn Pro Asp Ser Pro Thr  
260 265 270

Leu Lys Asn Asn Trp Gln Lys Val Tyr Thr Phe Thr Asp Ser Gly Gly  
275 280 285

Phe Gly Asn Asp Gly Glu Glu Cys Gly Gly Glu Pro Asp Gln Ile Ile  
290 295 300

Ser Trp Gly Gly Pro Ile Ala Thr Phe Arg Trp Asp Gly Ala Asn Asp  
305 310 315 320

Val Asp Ile Lys Asn Phe Ser Val Arg Glu Ile Gln Pro Pro Val  
325 330 335